SELECTED WATER RESOURCES ABSTRACTS

VOLUME 7, NUMBER 5
MARCH 1, 1974

W74-02151 -- W74-02650

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WATER RESOURCES ABSTRACTS

A Semimonthly Publication of the Water Resources Scientific Information Center,
Office of Water Resources Research, U.S. Department of the Interior

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The Secretary of the U. S. Department of the Interior has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through August 31, 1978.

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources."

The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.

FOREWORD

Selected Water Resources Abstracts, a semimonthly journal, includes abstracts of current and earlier pertinent monographs, journal articles, reports, and other publication formats. The contents of these documents cover the water-related aspects of the life, physical, and social sciences as well as related engineering and legal aspects of the characteristics, conservation, control, use, or management of water. Each abstract includes a full bibliographical citation and a set of descriptors or identifiers which are listed in the **Water Resources Thesaurus.** Each abstract entry is classified into ten fields and sixty groups similar to the water resources research categories established by the Committee on Water Resources Research of the Federal Council for Science and Technology.

WRSIC IS NOT PRESENTLY IN A POSITION TO PROVIDE COPIES OF DOCUMENTS ABSTRACTED IN THIS JOURNAL. Sufficient bibliographic information is given to enable readers to order the desired documents from local libraries or other sources.

Selected Water Resources Abstracts is designed to serve the scientific and technical information needs of scientists, engineers, and managers as one of several planned services of the Water Resources Scientific Information Center (WRSIC). The Center was established by the Secretary of the Interior and has been designated by the Federal Council for Science and Technology to serve the water resources community by improving the communication of water-related research results. The Center is pursuing this objective by coordinating and supplementing the existing scientific and technical information activities associated with active research and investigation program in water resources.

To provide WRSIC with input, selected organizations with active water resources research programs are supported as "centers of competence" responsible for selecting, abstracting, and indexing from the current and earlier pertinent literature in specified subject areas.

Additional "centers of competence" have been established in cooperation with the Environmental Protection Agency. A directory of the Centers appears on inside back cover.

Supplementary documentation is being secured from established discipline-oriented abstracting and indexing services. Currently an arrangement is in effect whereby the BioScience Information Service of Biological Abstracts supplies WRSIC with relevant references from the several subject areas of interest to our users. In addition to Biological Abstracts, references are acquired from Bioresearch Index which are without abstracts and therefore also appear abstractless in SWRA. Similar arrangements with other producers of abstracts are contemplated as planned augmentation of the information base.

The input from these Centers, and from the 51 Water Resources Research Institutes administered under the Water Resources Research Act of 1964, as well as input from the grantees and contractors of the Office of Water Resources Research and other Federal water resources agencies with which the

Center has agreements becomes the information base from which this journal is, and other information services will be, derived; these services include bibliographies, specialized indexes, literature searches, and state-of-the-art reviews.

Comments and suggestions concerning the contents and arrangements of this bulletin are welcome.

Water Resources Scientific Information Center
Office of Water Resources Research
U.S. Department of the Interior
Washington, D. C. 20240

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02 WATER CYCLE
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03 WATER SUPPLY AUGMENTATION AND CONSERVATION
Includes the following Groups: Saline Water Conversion; Water Yield Improvement; Use of Water of Impaired Quality; Conservation in Domestic and Municipal Use; Conservation in Industry; Conservation in Agriculture.

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07 RESOURCES DATA
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08 ENGINEERING WORKS
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ABSTRACT SOURCES

SELECTED WATER RESOURCES ABSTRACTS

01. NATURE OF WATER

1A. Properties

OPTICAL CONSTANTS OF WATER IN THE 200-NM TO 200-MICROMETER WAVELENGTH REGION,
Missouri Univ., Kansas City. Dept. of Physics.
For primary bibliographic entry see Field 02K.
W74-02167

02. WATER CYCLE

2A. General

CALIBRATING A WATER YIELD MODEL FOR SMALL UNGAGED WATERSHEDS,
Kentucky Dept. of Natural Resources, Frankfort. Div. of Water.
J. E. Jarboe, and C. T. Haan.
Paper No. 73-207 presented at 1973 Annual Meeting, American Society of Agricultural Engineers, University of Kentucky, Lexington, June 17-20, 1973. 27 p, 1 fig, 10 tab, 7 ref.

Descriptors: *Small watersheds, Model studies, *Water yield, *Calibrations, Instrumentation, Measurement, *Kentucky, Runoff, *Watershed management.

A four-parameter water yield model was calibrated to small Kentucky watersheds by relating the model parameters to watershed topographic, geologic and soil characteristics. The relationships were tested by comparing observed and simulated runoff records. (SCS)
W74-02172

HYDROLOGIC AND WATERSHED MODELING FOR WATERSHED PLANNING,
Soil Conservation Service, Portland, Oreg.
For primary bibliographic entry see Field 04D.
W74-02224

THE WATER BALANCE OF NEW ZEALAND,
Ministry of Works, Wellington (New Zealand). Water and Soil Div.
C. Toebes.
Journal of Hydrology (New Zealand), Vol 11, No 2, p 127-139, 1972. 1 tab, 23 ref.

Descriptors: *Water balance, Water yield, Water storage, Groundwater, Surface waters, Lakes, *Runoff, Rainfall, *Precipitation (Atmospheric), Data collections, Hydrologic data, *Evapotranspiration.
Identifiers: *New Zealand.

Using spearate estimates of average annual precipitation, evapotranspiration and runoff, a water balance for approximately 10 years was calculated for New Zealand. It is postulated that equilibrium conditions are never reached within the New Zealand hydrological system. The storage factor is relatively small. Only depletion of the groundwater above the base level in New Zealand is likely to have an effect on the water balance. (Knapp-USGS)
W74-02291

WATER-BALANCE METHOD AND ITS PRACTICAL IMPORTANCE, (METOD VODNOGO BALANSA I YEGO PRAKTICHESKOYE ZNACHENIYE),
Gosudarstvennyi Gidrologicheskii Institut, Leningrad (USSR).
P. S. Kuzin.
Meteorologiya i Gidrologiya, No 4, p 99-106, April 1973. 26 ref.

Descriptors: *Water balance, *Hydrologic cycle, Inflow, Discharge (Water), Precipitation (Atmospheric), Evaporation, Runoff, Water storage, *River basins, *Lake basins, Equations.
Identifiers: USSR, Global hydrology.

Evolution of concepts of the water-balance equation and practical importance of the water-balance problem are discussed. Four main objectives in the study of water balance are: (1) determination of the relation of balance items on natural factors (topography, geology, climate, soils, vegetation, etc.); (2) assessment of changes in balance items resulting from man's activities; (3) implementation of measures aimed at more rational use of water resources for power engineering, irrigation, navigation, water supply, etc.; and (4) control of accuracy of actual measurements of hydrometeorological elements and, in some cases, calculation of nonreadily measurable values. Depending on the objectives, the water-balance method can be used to quantitatively determine individual balance items for river basins and other areas and to establish geographic patterns in the distribution of relations between items. Studies of world water balance should begin on a national and regional scale with major river and lake basins to derive more correct estimates of water balance of continents, oceans, and the world. Special attention must be given to distribution of hydrometeorological networks, quality of observations, and accuracy of initial data used in water-balance computations. (Josefson-USGS)
W74-02308

ADJUSTMENT OF FRICTION IN HYDRAULIC MODELS OF LAKES,
Worcester Polytechnic Inst., Mass. Alden Research Labs.
For primary bibliographic entry see Field 02H.
W74-02314

ELEVATION DEPENDENT MODEL FOR ESTIMATING ANNUAL RUNOFF,
Wyoming Univ., Laramie. Water Resources Research Inst.
V. E. Smith, D. A. Anderson, and R. G. Scott.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10245, p 2293-2311, December 1973. 5 fig, 8 tab, 6 ref, 3 append.

Descriptors: *Topography, *Streamflow forecasting, *Rainfall-runoff relationships, *Mathematical models, Regression analysis.

Two procedures are given for decomposing runoff into components corresponding to different elevations. In the first method, the individual proportions of area in each band are regressed against the respective basin runoffs for each year to determine coefficients that represent the runoff contribution from each elevation band. Applying the principles of ridge regression analysis to this model yields stable estimates. The second procedure is an extension of the first and develops a functional relationship between the elevation variable and runoff. The two procedures were tested on 23 yrs of annual runoff from eight drainages in the upper Green River basin of the Wind River Range. The procedures give hydrologically interpretable results and are useful in modeling a drainage. The procedures are applicable for estimation of annual runoff for ungaged drainages and at stations where gaging has been discontinued. (Knapp-USGS)
W74-02317

A BAYESIAN DECISION FRAMEWORK FOR SYNTHETIC HYDROLOGY,
IBM Watson Research Center, Yorktown Heights, N.Y.
For primary bibliographic entry see Field 06A.
W74-02438

HYMO: PROBLEM-ORIENTED COMPUTER LANGUAGE FOR HYDROLOGIC MODELING--USERS MANUAL,
Agricultural Research Service, Riesel, Tex.
J. R. Williams, and R. W. Hann, Jr.
Southern Region Report ARS-S-9, May 1973. 75 p, 4 fig, 1 tab, 8 ref.

Descriptors: *Programming languages, *Computer programs, *Mathematical models, Simulation analysis, Rainfall-runoff relationships, Model studies.

HYMO is a problem-oriented computer language for modeling surface runoff and sediment yield from watersheds. HYMO was designed for planning flood prevention projects, forecasting floods, and research studies. It consists of a main program and 16 subroutines written in FORTRAN IV, but it can be used by hydrologists with little knowledge of computer programming. The language provides 17 commands for the hydrologist to use in any sequence for application to any watershed. HYMO was designed to transform rainfall data into runoff hydrographs and to route these hydrographs through streams and valleys or reservoirs. It will also compute the amount of sediment produced by a storm at nay point on a watershed. It will be useful to research hydrologists in studying the effects of watershed and storm characteristics on the flood hydrograph. HYMO is also a good research tool for testing hydrologic procedures. The hydrologic procedures used in HYMO are practical--required inputs are easy to obtain for most watersheds. HYMO was written for the IBM 360-65 computer, but it could be run on an IBM 1130 with little modification. The storage requirement is about 73K. (Knapp-USGS)
W74-02469

HYDROGEOLOGY OF CLOSED BASINS AND DESERTS OF SOUTH AMERICA, ERTS-1 INTERPRETATIONS,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07B.
W74-02588

PRELIMINARY ANALYSIS OF ERTS--RELAYED WATER-RESOURCES DATA IN THE DELAWARE RIVER BASIN,
Geological Survey, Harrisburg, Pa.
For primary bibliographic entry see Field 07B.
W74-02595

WATER-RESOURCES APPRAISAL OF FISH LAKE VALLEY, NEVADA AND CALIFORNIA,
Geological Survey, Carson City, Nev.
F. E. Rush, and T. L. Katzer.
Nevada Division of Water Resources, Water Resources-Reconnaissance Series Report 58, 1973. 70 p, 9 fig, 21 tab, 21 ref.

Descriptors: *Water resources, *Surface waters, *Groundwater resources, *Nevada, *California, Valleys, Hydrologic data, Water quality, Chemical analysis, Precipitation (Atmospheric), Runoff, Streamflow, Flow rates, Hydrogeology, Water wells, Water yield, Water supply, Water utilization, Water demand, Irrigation, Mining, Well data, Groundwater recharge, Hydrology.
Identifiers: *Fish Lake Valley (Nev. and Calif.).

Fish Lake Valley is in Esmeralda County, Nevada, and the adjoining part of Mono County, California. Fish Lake Valley has a population of about 200 in an area of about 1,010 square miles. The local economy is principally ranching and farming; however, some mining is done on an intermittent basis. The nearest trade center is Bishop, California, about 50 road miles southwest of the valley. The report describes the hydrologic environment; appraises the source, occurrence, movement, and chemical quality of water in the

area; estimates average annual recharge to and discharge from the groundwater reservoir; provides preliminary estimates of perennial yield and groundwater in storage; and estimates present and potential water development in the area. The field work was done mostly during August 1970 and March 1971. Groundwater development in Nevada has shown a substantial increase in recent years. A part of this increase is due to the effort to bring new land into cultivation, a renewed interest in mining, and a growing population. (Woodard-USGS)
W74-02616

SUMMARY OF HYDROLOGIC CONDITIONS IN COLLIER COUNTY, FLORIDA, 1972,
Geological Survey, Tallahassee, Fla.
J. McCoy.
Open-file report 73022, 1973. 118 p, 11 fig, 8 ref, append.

Descriptors: *Hydrologic data, *Water resources development, *Surface waters, *Groundwater resources, *Florida, Streamflow, Flow rates, Gaging stations, Water wells, Aquifer characteristics, Water yield, Water level fluctuations, Water utilization, Canals, Water quality, Chemical analysis, Basic data collections, Rainfall, Hydrology, Groundwater recharge, Urbanization.
Identifiers: *Collier County (Fla), *Naples (Fla).

This report is a continuation of annual summaries of hydrologic conditions in Collier County, Florida, which began in 1968. Streamflow and water-level fluctuations are graphed for the 1972 year (October 1971 to September 1972). Water-quality data are presented in table, graph, and diagram forms for their periods of record. Changes in hydrologic conditions are monitored by a data-collection network throughout the county and in the urbanized Naples area. The county-wide network consists of 5 streamflow gaging stations, 16 wells equipped with continuous water-level recorders, 19 wells sampled semiannually for chloride analyses, and 13 surface-water sites sampled semiannually for nutrient analyses. The Naples network consists of 1 streamflow gaging station, 3 wells equipped with continuous water-level recorders, about 75 wells sampled and/or measured semiannually for semiannually for chloride analyses and/or water-level fluctuations, and 4 surface water sites sampled quarterly for extensive analyses of chemical, physical, and bacteriological parameters. (Woodard-USGS)
W74-02622

PROPOSED WATER-RESOURCES AND LAND--CAPABILITY INVESTIGATION, ARUSHA REGION, TANZANIA,
Geological Survey, Lakewood, Colo.
E. D. Gordon, and J. F. O'Rourke.
Open-file report, March 1973. 118 p, 15 fig, 34 ref, 2 append.

Descriptors: *Water resources, *Surface waters, *Groundwater resources, *Land development, *Foreign countries, Tropical regions, Hydrologic data, Topography, Geology, Soil types, Climatic data, Water quality, Vegetation, Land use, Water supply, Human population, Water utilization, Rainfall, Temperature, Hydrology, Planning, Water resources development.
Identifiers: *United Republic of Tanzania.

The findings of a 3-month Phase I reconnaissance evaluation of the water-resources and land-use problems of the Arusha Region in north-central Tanzania are described. The scope, objectives and requirements are outlined for a proposed longer-term more intensive Phase II survey needed to develop a Master Water Plan for the Region. The Arusha Region lies 2 deg to 6 deg south of the Equator, and consequently, temperatures are relatively uniform throughout the year. Annual rainfall, which ranges from about 15 to slightly more than 60 inches, varies with elevation. In the cooler, higher and water-surplus areas cash-crop farming provides the economic base, but in the warmer, lower and water-deficient areas the economy is predominantly pastoral. The chief water and land-use problems in the Region are: (1) insufficient water supplies in some of the drier areas for human consumption; (2) insufficient water and forage in some areas to meet overlapping requirements of wildlife and livestock; and (3) increasing human, livestock, and agricultural pressure on the land and water resources of some areas with consequent deterioration of the wildlife habitat. (Woodard-USGS)
W74-02627

2B. Precipitation

SEVERE FLOODS AT NEW BRAUNFELS, TEXAS, MAY 1972,
Soil Conservation Service, San Marcos, Tex.
For primary bibliographic entry see Field 02E.
W74-02173

HURRICANE AGNES FLOODS EAST MAHANTANGO CREEK,
Agricultural Research Service, University Park, Pa. Northeast Watershed Research Center.
For primary bibliographic entry see Field 02E.
W74-02174

PSYCHROMETRIC DATA PATTERNS AND PREDICTION MODELS,
Wyoming Univ., Laramie. Water Resources Research Inst.
L. O. Pochop, S. A. Morton, and R. L. Cornia.
Available from the National Technical Information Service as PB-226 116, $3.00 in paper copy, $1.45 in microfiche. Water Resources Series No. 38, October 1973. 21 p, 6 fig, 7 tab, 9 ref. OWRR A-008-WYO (1). 14-31-0001-3851.

Descriptors: Water vapor, *Climatic data, Humidity, Air temperature, *Atmosphere, Hygrometry, Forecasting, *Wyoming, Model studies, Distribution patterns.
Identifiers: *Psychrometic data, *Prediction models.

Good psychrometric data are among the most difficult of all climatic parameters to obtain. However, uses of psychrometric data are numerous, especially in the field of water management. Results are presented of an investigation of the temporal and spatial patterns of the psychrometric data in Wyoming. Models for predicting psychrometric data from dry-bulb temperature, are included.
W74-02220

APPLICATION AND CONSEQUENCES OF PRECIPITATION OBSERVATIONS IN THE REPUBLIC OF SUDAN IN VIEW OF THE NOMADIC LIFE AND ECONOMY,
Southern Oregon Coll., Ashland. Dept. of Geography.
R. M. Hammer.
Geoform, No 14, p 11-18, 1973. 6 fig, 12 ref.

Descriptors: *Rainfall, *Satellites (Artifical), *Weather forecasting, Forages, Arid lands, *Climatic data, *Mapping.
Identifiers: *Sudan, Nomadism.

Rainfall data in Sudan reveal that 70 percent of the rainfall is produced by 25-30 percent of the storms. For agricultural purposes, where nomadism is an important factor in this arid country, forecasting occurrence of occasional heavy rain storms is of the utmost importance. Forage for livestock is dependent to a large extent on rainfall, and transhumance follows this pattern. Using satellite visible and infrared imagery, general rainfall conditions were verified, and daily rainfall determined. A series of maps showing the combined distribution of rainfall and clouds was produced, indicating that major cloud growth is associated with mountains and secondarily with water surfaces. (Paylore-Arizona)
W74-02348

AGROCLIMATIC AREAS FOR WHEAT AND BIOCLIMATIC CHARACTERISTICS OF ITS CULTIVARS IN URUGUAY, (IN SPANISH),
Buenos Aires Univ. (Argentina). Faculted de Agronomia y Veterinaria.
For primary bibliographic entry see Field 03F.
W74-02354

CALIFORNIA HIGH WATER, 1970-1971,
California State Dept. of Water Resources, Sacramento. Div. of Resources Development.
For primary bibliographic entry see Field 02E.
W74-02474

STORM RAINFALL IN THE CARPATHIANS IN JUNE 1969,
Ukrainskii Nauchno-Issledovatelskii Gidrometeorologicheskii Institut, Kiev (USSR).
P. M. Lyutik, and Ye. N. Kiptenko.
Soviet Hydrology: Selected Papers, No 5, p 417-425, 1971. 4 fig, 4 tab, 6 ref. Translated from Ukrainian Hydrometeorological Scientific Research Institute (Trudy UkrNIGMI), No 104, p 115-126, 1971.

Descriptors: *Storms, *Rainfall, Rainfall intensity, Runoff, Surface runoff, Storm runoff, Floods, Flood discharge, Runoff coefficient, Rainfall-runoff relationships, Mapping, Isohyets.
Identifiers: *USSR, *Carpathians.

Heavy rains in June 1969 produced disastrous floods in the Dniester, Prut, Seret, and Tisza River basins in the Eastern Carpathians. Continuous rainfall occured between June 7 and 10, amounting to 300 mm or more at many meteorological stations and exceeding normal June precipitation by a factor of 2-3. Maximum rainfall amounts were recorded during this storm at several meteorological stations in the Prut River basin (317 mm at Yablonovo and 397 mm at Kabaki). Total rainfall depth between June 7 and 10 over an area exceeding 22,000 sq km 100 mm or more. Largest amounts of rainfall occurred on northeastern slopes of the Carpathians and in the Ciscarpathians. Daily rainfall was heaviest in upper reaches of the Bystritsa Solotvinskaya River (239 mm), Bystritsa Nadvornyanskaya River (215 mm) and Prut River (173 mm). Daily rainfall was somewhat less (100-150 mm) in upper parts of the Seret, Cheremosh, Lomnitsa, Svicha, Stryy, and Tisza River basins. Daily rainfall was lowest (25-50 mm) in the Transscarpathians and in basins of the Tereblya, Rika, Latoritsa, and Uzh Rivers. Daily rainfall during the first ten days of June, changes in maximum rainfall depth and average rainfall intensity as a function of rainfall duration, and flood-runoff depths and coefficients for Carpathian Rivers are tabulated. (Josefson-USGS)
W74-02606

STORM RAINFALL IN THE BLACK SEA REGION AS A FACTOR IN SOIL EROSION,
Ukrainskii Nauchno-Issledovatelskii Gidrometeorologicheskii Institut, Kiev (USSR).
N. I. Konovalova, and N. K. Mirotvorskaya.
Soviet Hydrology: Selected Papers, No 5, p 425-428, 1971. 2 fig, 3 tab, 5 ref. Translated from Ukrainian Hydrometeorological Scientific Research Institute (Trudy UkrNIGMI), No 104, p 134-138, 1971.

Descriptors: *Storms, *Rainfall, *Rainfall intensity, *Soil erosion, Slopes, Runoff, Overland flow, Probability, Equations.

Identifiers: *USSR, *Black Sea region.

Soil erosion in the southern Ukraine is greatly affected by storm rainfall. In the Ordinary Chernozem zone in the northwestern part of the Black Sea region, erosion can be produced by a rainfall intensity of about 1.0 mm/min and on strongly eroded slopes by a rainfall intensity of 0.7-0.8 mm/min. These heavy rains occur on an average of two to three times a year, and heavier rains with a maximum intensity of 2.0 mm/min occur once every three to five years. An increase in rainfall intensity sharply increases soil erosion. The effect of different rainfall intensities on runoff and erosion is graphed, and probable and maximum possible durations of downpours of different intensities are tabulated. (Josefson-USGS)
W74-02607

WATER RECYCLING OF SEWAGE EFFLUENT BY IRRIGATION: A FIELD STUDY ON OAHU,
Hawaii Univ., Honolulu. Water Resources Research Center.
L. S. Lau, P. C. E. Kern, P. Loh, R. H. F. Young, and G. L. Dugan.
Technical Report No. 62, November 1972. 89 p, 24 fig, 5 tab, 52 ref.

Descriptors: Rainfall, Rainfall disposition, *Rainfall intensity, Measurement, Climatology, Meteorology, *Climatic data, Irrigation, Recycling, *Water reuse, *Sewage effluents, *Hawaii.

Annual, monthly, and hourly rainfall data for Hilo, Hawaii are plotted and analyzed as a preliminary phase of the study of space-time variations in high intensity rainfall in this locality. A brief summary of the Hilo climate is provided. Annual rainfall amounts are shown to be highly variable, while the annual rainfall frequency remains relatively constant at about 33 percent. Monthly rainfall and maximum 24-hour rainfall amounts are displayed in the form of a monthly rainfall expectancy graph. Hourly rainfall amounts are divided into four intensity categories: 0.01 - 0.24, 0.24 - 0.49, 0.50 - 0.99 and > or equal to 1.00 inches per clock hour. The percentage distribution of annual and monthly rainfall amounts and frequencies by rainfall intensity category are plotted and discussed. Hourly data are displayed in a series of monthly diurnal distributions by rainfall intensity category. (Fullerton-Hawaii)
W74-02631

STATISTICAL ANALYSIS OF NORTH CAROLINA PRECIPITATION DATA,
North Carolina State Univ., Raleigh. Dept. of Geosciences.
C. K. Bayne, and A. H. Weber.
Preprint Proceedings of Third Conference on Probability and Statistics in Atmospheric Science, American Meteorological Society, June 19-22, 1973, Boulder, Colo. 2 p, 3 ref. OWRR A-061-NC (2). 14-31-0001-3833.

Descriptors: *Rainfall, *Precipitation (Atmospheric), *Droughts, *Frequency analysis, *Probability, Meteorology, *Markov processes, Statistical methods, Stochastic processes, *North Carolina, Climatic data.

Methodology for estimating probability of sequence of wet and dry days was applied to rainfall data from 48 stations in North Carolina. The procedure is based on 1st order Markov Theory, and includes variance of initial and transitional probabilities and confidence limits. (Howells-North Carolina)
W74-02632

2C. Snow, Ice, and Frost

EVAPORATION FROM SNOWDRIFTS UNDER OASIS CONDITIONS,
Wyoming Univ., Laramie. Water Resources Research Inst.
For primary bibliographic entry see Field 02D.
W74-02183

MEASURING SNOWFALL, A CRITICAL FACTOR FOR SNOW RESOURCE MANAGEMENT,
Wyoming Univ., Laramie. Water Resources Research Inst.
P. A. Rechard, R. E. Brewer, and A. Sullivan.
Typescript, (1973). 10 p, 4 fig, 11 ref. NOAA 1-36055.

Descriptors: *Measurement, *Snowfall, *Snow management, *Computer models, Watershed management, *Gages, Instrumentation.

With the advent of detailed computer modeling techniques for determining the effects of watershed management practices, the ability to quantify the precipitation input is of critical importance. The measurement of precipitation in the form of snow is an observation task which to date has proven unsatisfactory. Under windy conditions the catch of snowfall by usual precipitation gages may be eighty percent in error. The findings of this study indicate that the catch of a gage placed in a manmade site shield utilizing the blowfence design, termed the Wyoming Shield, can duplicate that of a gage placed within a forested opening. The advantages of the Wyoming Shield are that it is always uniform, i.e. not subject to the natural variations in timber protection, it provides freedom of choice for siting a gage, and it is relatively inexpensive. As a general guide, unshielded gages catch per season from one-third to one-half the amount of precipitation that a well-protected gage in a forest opening catches. A gage with only a free swinging Alter-type shield catches from two-thirds to three-fourths the amount a well-protected gage catches, while a gage shielded with the Wyoming Shield configuration will catch about the same amount.
W74-02184

AN ENCLOSED WEIR FOR SMALL STREAMS IN SNOW COUNTRY,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 07B.
W74-02249

PREDICTING AVALANCHE INTENSITY FROM WEATHER DATA: A STATISTICAL ANALYSIS,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
A. Judson, and B. J. Erickson.
Research Paper RM-112, August 1973. 5 fig, 3 tab, 5 ref.

Descriptors: *Avalanches, *Weather data, *Regression analysis, Statistics, Data collections, Forecasting, Snowpacks, Precipitation (Atmospheric), Winds, *Colorado, Storms.
Identifiers: *Avalanche forecasting.

Nineteen weather factors were analyzed to determine which have the highest correlation with avalanche activity. A simple two-parameter storm index and a discriminant function model were found to predict the likelihood of avalanches in Colorado's Forest Range. The storm index utilizes precipitation intensity modified by windspeed to predict the number of avalanches expected on 23 paths. The discriminant function model was used in conjunction with a multiple regression program to classify snow as stable or unstable on eight avalanche paths. This analysis shows that a linear combination of the maximum 3-hour precipitation intensities, windspeed resolved to an optimum direction for each path, and the sum of the negative temperature departures from 20 deg F could be used to determine whether a slope will avalanche 70% to 80% of the time. (Knapp-USGS)
W74-02294

EFFECTS OF HIGHWAY BRIDGE CONSTRUCTION ON A SUBARCTIC STREAM,
For primary bibliographic entry see Field 04C.
W74-02295

DETERMINATION OF THE MICROLEVEL TEMPERATURES DURING LAKE COOLING, ICE FORMATION, ICEMELT AND THE BREAK-UP OF THE ICE COVER OF A MOUNTAIN LAKE, HOLLAND LAKE, MISSOULA COUNTY,
Missoula. Dept. of Zoology.
L. G. Browman.
Available from the National Technical Information Service as PB-226 241 $2.75 in paper copy, $1.45 in microfiche. Montana University Joint Water Resource Research Center, Bozeman Report No. 40, (1973) 12p, 2 tab, 12 ref. OWRR A-04-MONT (1).

Descriptors: *Ice, *Lake Ice, *Melting, *Thawing, *Montana, *Temperature.
Identifiers: *Holland Lake (Mont), Ice formation, Microlevel temperatures, Ice breaking.

The primary objective was to determine the microlevel temperatures during lake cooling, ice formation, ice melt and the break-up of the ice cover of a mountain lake. The observations were carried out on Holland Lake, Montana which is located west of the Continental Divide at an elevation of 1,225 meters, is roughly 165 hectares in area with a maximum depth of 48 meters. It is a dimicitc, Oligotrophic lake surrounded by a complex of Douglas fillarch forest. (Holje-Montana)
W74-02447

COMBINED HEAT, ICE AND WATER BALANCES AT SELECTED GLACIER BASINS. PART II: SPECIFICATIONS, STANDARDS AND DATA EXCHANGE.

UNESCO/IASH Contribution to the International Hydrological Decade (Technical Papers in Hydrology, No 5); Paris, 1973. 32 p, 2 fig, 1 tab, 5 ref, append.

Descriptors: *Glaciohydrology, *Water balance, *Glaciology, *International Hydrological Decade, Water sources, Data collections, Heat, Ice, Melt water, Heat balance, Snow.
Identifiers: *Glacier basin hydrology.

The International Hydrological Decade (IHD) project concerned with the combined heat, ice, and water balances at selected glacier basins marks an important step in broadening the understanding of snow hydrology, high mountain and glacier hydrology, and the relation of glacier variations to changes in climate. The specific objective of the project is to obtain sufficient information to define and understand heat, ice and water blances and how they change with time at a number of glacier basins situated in widely differing environments in many parts of the world. Emphasis is on specifications and standards for types, locations, and timing of measurements, with particular attention given to heat balances. The intention is to provide a basis for international cooperation in attaining standardized measurements of all three glacier balances. This project is intimately linked to many other Decade projects such as the world inventory of perennial ice and snow masses, variations of existing glaciers and the world water balance. (Woodward-USGS)
W74-02470

ANTARCTIC LIMNOLOGY: A REVIEW,
R. B. Heywood.
Br Antarct Surv Bull. 29, p 35-65. 1972. Illus.
Identifiers: *Antarctic limnology, Climates, Geography, History, *Reviews, Cold regions.

Information on Antarctic inland waters is presented against a background of historical geographical, topographical, geological and climatic detail. Present knowledge suggests that aridity is the most important climatic factor determining the variety of lake and pool environments in Antarctica. Comparison with Arctic inland waters indicates that the considerably poorer biota of Antarctica largely reflects the isolation and the youth of the ecosystem. The review reveals the need for basic, comprehensive research program in all areas of the continent.--Copyright 1973, Biological Abstracts, Inc.
W74-02552

USE OF ERTS DATA FOR MAPPING SNOW COVER IN THE WESTERN UNITED STATES,
Environmental Research and Technology, Inc., Lexington, Mass.
For primary bibliographic entry see Field 07B.
W74-02603

EVALUATION OF ERTS IMAGERY FOR MAPPING AND DETECTION OF CHANGES OF SNOWCOVER ON LAND AND ON GLACIERS,
Geological Survey, Tacoma, Wash.
For primary bibliographic entry see Field 07B.
W74-02604

THERMAL REGIME OF THE LOWER REACHES OF THE DANUBE RIVER IN AUTUMN AND WINTER,
Ukrainskii Nauchno-Issledovatelskii Gidrometeorologidheskii Institut, Kiev (USSR).
A. V. Shcherbak, and L. I. Solopenko.
Soviet Hydrology: Selected Papers, No 5, p 414-417, 1971. 1 fig, 1 tab, 8 ref. Translated from Ukrainian Hydrometeorological Scientific Research Institute (Trudy UkrNIGMI), No 104, p 52-56, 1971.

Descriptors: *Ice, *Temperature, *Heat balance, *Water cooling, *Seasonal, Autumn, Winter, Air circulation, Synoptic analysis, Forecasting, Probability.
Identifiers: *USSR, *Danube River, Heat exchange.

Results are presented of investigations of the thermal regime of the Soviet reach of the Danube River in autumn and winter. Average long-period (1945-68) ten-day water temperatures in the reach are tabulated, and a relation of beginning dates of ice formation in the river at Izmail to the heat content of river water and the index of the combination of synoptic processes is graphed. The probability of early and late dates of ice formation is 89% and 83%, respectively. The relation obtained can be used to prepare a tentative forecast of development of ice phenomena in the Soviet reach of the Danube in autumn and winter. (Josefson-USGS)
W74-02605

A HYDROGEOTHERMAL DESCRIPTION OF GROUNDWATER IN UPPER CRETACEOUS DEPOSITS IN THE SOUTHEAST ARAL SEA AREA (GIDROGEOTERMICHESKAYA KHARAKTERISTIKA PODZEMNYKH VOD VERKHNEGO MELA YUGO-VOSTOCHNOGO PRIARAL'YA),
Akademiya Nauk Uzbekskoi SSR, Tashkent. Institut Seismologii.
For primary bibliographic entry see Field 02F.
W74-02609

EXPERIENCE IN A QUANTITATIVE ASSESSMENT OF ORGANIZATION OF SNOW COVER AS A NATURAL SYSTEM (OPYT KOLICHESTVENNOY OTSENKI ORGANIZATSII SNEZHNOGO POKROVA KAK PRIRODNOY SISTEMY),
E. G. Kolomyts.
Institut Geografii Sibiri i Dal'nego Vostoka Doklady, No 34, p 44-56, 1972. 6 fig, 1 tab, 16 ref.

Descriptors: *Snow cover, *Snow, *Crystals, *Estimating, *Statistical methods, Correlation analysis, Sublimation, Entropy, Winter, Curves, Maps.
Identifiers: *USSR, Siberia.

Snow cover is examined as a natural community of crystals of different sizes and shapes. This community has a definite degree of metamorphism, whose parameters are the complexity and degree of ordering of the snow layer and its individual horizons. A quantitative assessment was made of the degree of metamorphism of snow, based on the principles and techniques of the systems theory, the information theory, and the set theory. Relations suitable for calculating parameters of the organization of any natural systems are presented. A sketch map of the degree of metamorphism of snow cover in forested and adjoining regions of the USSR was constructed from an empirical relation of the measure of disordering of the snow layer to the magnitude of latitudinal continentality in winter in lowland and mountain taiga regions of West and East Siberia. (Josefson-USGS)
W74-02613

BEAR GLACIER HAS COME ALIVE (LEDNIK MEDVEZHIY OZHIL),
Akademiya Nauk SSSR, Moscow. Institut Geografii.
L. D. Dolgushin.
Priroda, No 8, p 114-116, August 1973. 3 photo, 2 ref.

Descriptors: *Glaciers, *Lakes, *Movement, Ice, Snowmelt, Mountains, Alpine.
Identifiers: *USSR, *Bear Glacier, *Glacier surges.

The present advance of Bear (Medvezhiy) Glacier in Tadzhikistan was first detected on April 17, 1973. Initial reports indicated that the glacier terminus had already advanced a distance of 1,400-1,500 m and had divided the Abdukagor and Dustiroz Valleys. According to estimates, the glacier surge began no later than early March. By May 9 the glacier tongue, which was 150-200 m thick, had moved 1.5 km down valley along the Vanch River, advancing out to the Abdukagor Valley and forming a lake with an accumulation of 6-7 million cu m of water. The glacier terminus continued to move at a rate of 4-5 m a day, while the lake level rose at a rate of about 50-70 cm a day. By the end of May, about 9 million cu m of water had already accumulated in the lake. An outburst of the lake through its ice dam will produce severe flooding in the Vanch Valley and, possibly, a destructive mudflow, thereby endangering the Vanch Hydroelectric Station, bridges across the Vanch River, highways, powerlines, and a number of dwellings in the populated Vanch River Valley. According to the latest progress report (June 4, 1973), precautionary measures are being taken to protect the inhabitants and to prevent possible damage. The Pamir Alpine Expedition of the USSR Academy of Science's Institute of Geography and an expedition of the Tadzhik Administration of the Hydrometeorological Service are conducting systematic observations of the glacier advance and of the accumulation of water in the dammed lake. (Josefson-USGS)
W74-02614

HYPERBOLIC STRESS EQUATIONS FOR COMPRESSIBLE SLABS,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
R. I. Perla.
International Journal of Non-Linear Mechanics, Vol 8, p 253-259, 1973. 2 fig, 1 tab, 1 ref.

Descriptors: *Stress, *Snowpacks, *Equations, *Deformation, Compressive strength, Shear strength, Creep, Elastic theory.
Identifiers: *Snow mechanics.

In principle it is possible to formulate a system of stress equations for slabs composed of compressible materials such as snow. A constitutive law, chosen to model isotropic compressible slabs, is specialized for plane deformation and then substituted into the equations of motion. The resulting system is quasi-linear hyperbolic. Solutions depend on measurements of a deformation-rate parameter, D. The characteristics of the hyperbolic system span a distance 2DH, where H is the penetration of the characteristics into the slab. It is a feasible task to measure in situ the deformation or flow field of select portions of many types of slabs. For example, the flow field of a portion of a snow slab, which under body forces may compress to over 100% increase of density, is easily determined by following the movement of lightweight tracers (ping-pong balls, styrofoam plats, etc.) inserted into the slab. Slab stress can be inferred directly from such in situ measurements. (Knapp-USGS)
W74-02624

2D. Evaporation and Transpiration

EVAPORATION FROM SNOWDRIFTS UNDER OASIS CONDITIONS,
Wyoming Univ., Laramie. Water Resources Research Inst.
P. A. Rechard, and C. N. Raffelson.
Typescript, (1973). 10 p, 1 fig, 4 tab, 6 ref. NOAA 16-258-CA.

Descriptors: *Snowpacks, *Evaporation, *Wyoming, Measurement, Snowmelt.
Identifiers: *Pole Mountain (Wyo), *Snow fences.

It is possible to modify snow accumulation patterns by utilizing artificial wind barriers, such as snow fences. However, economical utilization of the snowdrifts requires that the resultant increase in water supply be obtained at a reasonable cost which assumes an ability to estimate the increase. To determine the quantity of increased water supply, it is necessary to know the amount of water lost from the drift through evaporation. A study to measure evaporation was conducted on Pole Mountain in southeastern Wyoming, wherein two snowdrifts were formed on top of butyl rubber mats behind two separate snow fences, each 8 feet high (2.4 m) x 100 feet (30 m) long. The water equivalents of the drifts were determined, and the quantity of runoff from the melting of the drifts was measured. Since there could be no infiltration, the difference between the water equivalency of the drift and the runoff was a measure of the evaporation, which during the one-month ablation period, was approximately 20-30 percent of the volume of the drift at the start of ablation. During the melt season the snowdrifts are 'oases' of snow, in that they are surrounded by bare ground. Because of this fact, and the extreme wind packing of the snow, existing models to compute evaporation are not adequate.
W74-02183

COMPARISON OF RAINGAUGE EVAPORATION SUPPRESSANTS,
Otago Univ., Dunedin (New Zealand). Dept. of Geography.
D. L. Murray.

Journal of Hydrology (New Zealand), Vol 11, No 2, p 99-104, 1972. 1 fig, 3 tab, 2 ref.

Descriptors: *Rain gages, *Evaporation control, Instrumentation, Equipment, Precipitation gages.

The efficiencies of two evaporation suppressants for protecting rain-gage catch are composed. Kerosene is inferior to light machine oil when high-precision data are required. Approximately 50 g of oil gave satisfactory evaporation suppression. (Knapp-USGS)
W74-02289

WATER REGIME OF SOLONCHAK SOLONETZES IN OPEN AREAS OF FORESTS IN THE NORTH CASPIAN SEA REGION, (VODNYY REZHIM SOLONCHAKOVYKH SOLONTSOV NA POLYANAKH LESNYKH NASAZHDENIY SEVERNOGO PRIKASPIYA),
For primary bibliographic entry see Field 02G.
W74-02301

A STUDY OF ITEMS IN THE GROUNDWATER BALANCE OF WATERLOGGED AREAS (OB UZUCHENII ELEMENTOV BALANSA GRUNTOVYKH VOD NO ZABOLOCHENNYKH UCHASTKAKH),
A. Yesenbekov.
Uzbekskiy Geologicheskiy Zhurnal, No 1, p 79-81, 1973. 2 fig, 1 tab, 4 ref.

Descriptors: *Evapotranspiration, *Evaporation, *Transpiration, *Saturated soils, *Lysimeters, Vegetation, Grasses, Plant growth.
Identifiers: *USSR.

Lysimeters filled with undisturbed soil samples 1.44 sq m in area and 2.0 m deep were used to determine total evaporation from waterlogged areas (with and without natural vegetation) in the Amu-Dar'ya Delta in 1967-70. Maximum evaporation from a bare waterlogged surface was observed during the hottest days of August (1967) and was 2,286.2 cu m/ha. Maximum evaporation from waterlogged areas covered by bulrushes (9,740.3 cu m/ha) was observed in July (1970). Maximum evaporation from an area of dry-valley grasses was 4,650 cu m/ha. Relation of total evaporation from waterlogged areas covered by bulrushes to their growth, and total evaporation from an area of dry-valley grasses at a water table depth of 0.5 m from the soil surface are graphed. (Josefson-USGS)
W74-02610

EVAPOTRANSPIRATION AND WATERSHED RESEARCH AS RELATED TO RIPARIAN AND PHREATOPHYTE MANAGEMENT--AN ABSTRACT BIBLIOGRAPHY.
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.

Available from GPO, Washington, DC 20402 Price $2.00. Forest Service Miscellaneous Publication No 1234, January 1973. J. S. Horton, Compiler, 192 p, 691 ref.

Descriptors: *Evapotranspiration, *Riparian water loss, *Phreatophytes, *Bibliographies, *Abstracts, Information retrieval, Publications, Water loss, Vegetation, Lysimeters, Climates, Environmental effects, Analytical techniques, Indexing, Energy budget.

Published information is presented that will help land managers and research workers to: (1) evaluate relations of vegetation to water loss and (2) estimate the probable effect on water yield of manipulating vegetation. The bibliography emphasizes moist-site vegetation, both phreatophyte and riparian, but watershed and plot studies are included if they can be useful in determining the effect of vegetation management on water yield. The development and use of various kinds of lysimeters are comprehensively reviewed to give a full picture of their value in determining evapotranspiration losses. Methods of estimating or measuring water losses (such as sap-flow instrumentation or the energy-budget approach) are given full coverage; even though in many cases the studies were carried out on agricultural lands, the methods might be adapted for use with moist-site vegetation. Articles on the various processes affecting evapotranspiration, including physiological, climatic, and general environmental processes are included if they have a direct bearing upon measurement of water loss in phreatophyte and riparian situations. The 691 references are arranged alphabetically by author within the subject-matter class. An author index gives item numbers. (Woodard-USGS)
W74-02630

2E. Streamflow and Runoff

LONG WAVES IN SHALLOW TRIANGULAR CHANNELS,
Wisconsin Univ., Madison.
T. Green.
Journal of Hydraulic Research, Vol 11, No 1, p 69-90, 1973. 12 fig, 17 ref.

Descriptors: *Waves (Water), *Flood waves, *Seiches, Mathematical studies, Tides, Surges, Bores.

Long waves travelling along rivers or channels were studied in a very simple analytical model which still preserves the desired characteristics of cross-channel depth variation and asymmetry: a straight, shallow channel of general triangular cross-section. A number of rivers have depth profiles which are somewhat triangular. Similar analytical techniques could be used to study waves in shallow channels of any prismatic cross-section. (Knapp-USGS)
W74-02158

SYSTEM 21, 'JUPITER' (A DESIGN SYSTEM FOR TWO-DIMENSIONAL NEARLY-HORIZONTAL FLOWS),
Danish Hydraulic Inst., Copenhagen. Computational Hydraulics Center.
For primary bibliographic entry see Field 07C.
W74-02159

A SHEAR PLATE FOR USE IN OSCILLATORY FLOW,
Queen's Univ., Kingston (Ontario). Coastal Engineering Research Lab.
P. H. Riedel, and J. W. Kamphuis.
Journal of Hydraulic Research, Vol 11, No 2, p 137-156, 1973. 9 fig, 16 ref.

Descriptors: *Unsteady flow, *Shear stress, *Waves (Water), *Instrumentation, Laminar flow, Turbulent flow, Roughness (Hydraulic), Data collections, Hydraulic models.
Identifiers: *Oscillating water tunnel.

A floating-element shear stress transducer provides an accurate means for measuring shear stress on smooth and rough beds under oscillatory flow. It is especially useful for measurements in oscillatory boundary layers because a knowledge of the boundary layer structure is not required. The instrument gives complete response to forcing functions with periods greater than 0.5 seconds and may be used to measure shear stresses in the range 0.015-100 N per sq m. Accurate computation of forces requires: (a) measurement of the pressure acting on the leading and trailing edges of the shear plate, (b) an assumption regarding the manner in which the pressure force acts on the roughness elements and (c) calibration of the shear plate for vertical load. (Knapp-USGS)
W74-02161

THE TURBULENT TEMPERATURE MIXING LAYER,
Queen's Univ., Kingston (Ontario). Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W74-02162

SEVERE FLOODS AT NEW BRAUNFELS, TEXAS, MAY 1972,
Soil Conservation Service, San Marcos, Tex.
A. B. Colwick, H. N. McGill, and F. P. Erichsen.
Paper No. 73-206 presented at 1973 Annual Meeting, American Society of Agricultural Engineers, University of Kentucky, Lexington, June 17-20, 1973. 6 p, 12 fig, 2 tab.

Descriptors: *Texas, *Floods, *Rainfall intensity, Storms, *Excessive precipitation, Floodwater, *Flash floods.
Identifiers: *New Braunfels (Tex).

The flood-producing storm of May 11-12, 1972, in the New Braunfels, Texas, area is described in detail. Sixteen inches of rain fell in a 4-hour period. Fifteen lives were lost to the rampaging floodwaters that inundated 400 homes and caused approximately $5,700,000 in damages. (SCS)
W74-02173

HURRICANE AGNES FLOODS EAST MAHANTANGO CREEK,
Agricultural Research Service, University Park, Pa. Northeast Watershed Research Center.
E. T. Engman, L. H. Parmele, and W. J. Gburek.
Paper No. 73-205 presented at 1973 Annual Meeting, American Society of Agricultural Engineers, University of Kentucky, Lexington, June 17-20, 1973. 17 p, 9 fig, 1 tab, 11 ref.

Descriptors: *Pennsylvania, *Tropical storms, Excessive precipitation, *Rainfall intensity, Runoff, *Rainfall-runoff relationships, Watershed management.

The greatest rainfall amounts from the June 1972 tropical storm which devastated the Susquehanna River Valley occurred over the East Mahantango Creek Watershed, Pennsylvania. The rainfall intensities and peak runoff rates both surpassed the expected values for a 100-year event. In the latter part of the storm, data from the 7.8 sq km watershed indicate that runoff rates were approximately equal to the rainfall rates. (SCS)
W74-02174

TWO-DIMENSIONAL WAVES GENERATED BY A SURFACE PRESSURE DISTURBANCE OVER A SLOPING BEACH,
New York Univ., N.Y. Courant Inst. of Mathematical Sciences.
M. C. Shen.
Report No. IMM-NYU 342, NR 062-160, July 1965. 47 p, 4 fig, 12 ref, 2 append. ONR Nonr-285 (55), NSF-GP-3465.

Descriptors: *Coasts, *Beaches, *Waves (Water), Equations, *Shallow water, Pressure, Equilibrium.
Identifiers: Steady state problem, Transient problem.

Two-dimensional water waves generated by a prescribed pressure disturbance on the equilibrium surface of a uniformly sloping beach is studied by means of the Laplace transform technique applied to the equations of the linear theory. Both transient and steady problems are considered, and in each case the problem reduces to solving an inhomogeneous q-difference equation. The arbitrary constants in the solutions of the transient and the steady-state problem are determined by respectively imposing a boundedness condition and a radiation condition at infinity. The example of an oscillatory point pressure acting on the equilibrium surface of a 45 degree beach is worked out in

detail. It seems easier to derive the steady-state solution from the transient problem than to find it directly. (Sinha-OEIS)
W74-02187

INPUT SPECIFICATIONS TO STOCHASTIC DECISION MODELS,
Arizona Univ., Tucson. Dept. of Systems Engineering.
D. M. Clainos.
Available from NTIS as PB-226 091 $6.00 in paper copy, $1.45 in microfiche. M S Thesis, May, 1972. 60 p, append. OWRR A-024-ARIZ (8). 14-31-0001-3503.

Descriptors: *Decision making, *Stochastic processes, *Synthetic hydrology, Model studies, Mathematical models, Streamflow.
Identifiers: *Streamflow synthesis, Conditional dependency, Discrete matrices.

The use of discrete conditional dependency matrices as input to stochastic decision models is examined. Some of the problems and initial assumptions involved with the construction of the matrices are discussed. Covered in considerable detail is the transform used to relate the gamma space with the normal space. A new transform is introduced that should produce reasonable results when the record of streamflows (data) has a highly skewed distribution. Finally, the possibility of using the matrices to provide realistic inputs to a stochastic dynamic program is discussed.
W74-02209

ULTRASONIC RIVER FLOW MEASUREMENT,
Atomic Energy Research Establishment, Harwell (England).
W. R. Loosemore.
Ultrasonics, Vol 11, No 5, p 195-196, September 1973. 2 fig.

Descriptors: Flow measurement, *Flowmeters, *River flow, *Flow rates, *Instrumentation, *Ultrasonics, Automatic control, Data processing, Computers, Gages, Foreign research, Europe, Monitoring.
Identifiers: *United Kingdom (Thames River).

A brief description is given of a new ultrasonic flowmeter which measures total flow rates in rivers directly, automatically, and continuously. Measurements are made at preselected intervals, normally every 15 min, and the result is displayed locally in numerical form and then transferred to punched paper tape for computer input. Water level data, measured concurrently by a resistance gage, are automatically combined with the ultrasonically determined velocity to compute volume flow rates. The device was developed by the British Water Resources Board (WRB) and Atomic Energy Research Establishment. It was first installed in January 1973 at Clifton Reach on the Thames in cooperation with the Thames River Conservancy. (Brown-IPC)
W74-02250

MAPPING AVERAGE ANNUAL SURFACE WATER RESOURCES OF THE HYDROLOGICAL REGIONS OF NELSON, NEW ZEALAND,
Ministry of Works, Nelson (New Zealand). Water and Soil Div.
F. Scarf.
Journal of Hydrology (New Zealand), Vol 11, No 2, p 105-126, 1972. 7 fig, 2 tab, 8 ref, 3 append.

Descriptors: *Mapping, *Data collections, *Hydrologic data, Water resources, Water yield, Stream gages, Streamflow forecasting.
Identifiers: *New Zealand (Nelson).

A method for mapping average annual water resources is based on the hydrological region concept. River gaging data from temporary sites are correlated with concurrent data from representative basins or other long-term recording sites. A comparison is made between results obtained using a simple water balance approach and those obtained by gaging and correlation. Use of the correlation equations for evaluating other flow characteristics such as minimum flow and flow duration for previously ungaged sites is discussed briefly. The average annual pattern of surface water resources for the Nelson district, New Zealand, is presented using this method. (Knapp-USGS)
W74-02290

RIVER REGIMES IN IRAN,
Durham Univ. (England). Dept. of Geography.
P. Beaumont.
Durham University Department of Geography Occasional Publications (New Series), No 1, 1973. 29 p, 11 fig, 2 tab, 23 ref.

Descriptors: *Streamflow, *Flow rates, *Hydrologic data, Foreign countries, *Drainage area, Topography, Rainfall-runoff relationships, Hydrographs, Correlation analysis, Mountains, Snowmelt, Reviews, Evaluation.
Identifiers: *Iran, River regimes.

The drainage systems of Iran can be divided into Caspian Sea drainage, Persian Gulf drainage and drainage into the central part of the country. The first and last regions are areas of interior drainage. Winter is the rainy season in Iran, during which period at least two-thirds of the country receives more than half its annual precipitation total. The regime hydrographs of 45 rivers reveal marked similarities, with peak discharges occurring mainly in the period Esfand through Ordibehesht (March through May), owing largely to the effect of snowmelt. Analysis of the river regimes broad hydrographic regions which differ from the three major groupings based on direction of drainage. The largest runoff values per unit area occur in the northern and central parts of the Zagros Mountains and in the Elburz Mountains. The lowest runoff values are in a belt around the desert regions of central Iran. (Woodard-USGS)
W74-02298

SURFACE AND INTERNAL WAVES, (POVERKHNOSTNYYE I VNUTRENNIYE VOLNY),
Akademiya Nauk URSR, Sevastopol. Marine Hydrophysics Inst.
L. V. Cherkesov.
Izdatel'stvo 'Naukova Dumka', Kiev, 1973. 248 p.

Descriptors: *Waves (Water), *Internal waves, *Gravity waves, *Ocean waves, *Tsunamis, Energy, Celerity, Viscosity, Density, Pressure, Atmospheric pressure, Depth, Surfaces, Interfaces, Ice-water interfaces, Ice cover, Fluid mechanics, Curves, Equations, Investigations.
Identifiers: USSR, *Surface waves.

Theoretical studies were made of surface and internal gravity waves generated by impulsive, periodic, and traveling disturbances. Examined are tsunami waves caused by submarine earthquakes, internal waves produced by periodic and traveling atmospheric pressures in a continuously stratified sea, and effects of viscosity and discontinuity of density at the water-ice interface on gravity waves. (Josefson-USGS)
W74-02299

PROBABILITY ANALYSIS IN AN APPROXIMATE THEORY OF MOVEMENT OF WATER MASSES, (VEROYATNOSTNYY ANALIZ V PRIBLIZHENNOY TEORII PEREMESHCHENIYA VODNYKH MASS),
Tomsk State Univ. (USSR).
D. A. Burakov.
Meteorologiya i Gidrologiya, No 4, p 52-58, April 1973. 2 fig, 8 ref.

Descriptors: *Statistical methods, *Frequency analysis, *Probability, *Distribution, Variability, Curves, Equations.
Identifiers: USSR, *Traveltime, Pearson distributions.

The probabilistic approach was applied to an interpretation and determination of traveltime. The traveltime curve, which is widely used in flood hydrograph computations, can be considered as a probability density function of traveltime of a volume element of water. To analytically express a traveltime curve, distribution curves of random variables, such as the curve for the Pearson Type III distribution, can be used. The shape of the traveltime curve is determined by statistical parameters which have a clear physical meaning. (Josefson-USGS)
W74-02305

COMPUTER SIMULATION OF STORM WATER RUNOFF,
Northwestern Univ., Evanston, Ill. Technological Inst.
F. F. Offner.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10216, p 2185-2194, December 1973. 4 fig, 5 ref.

Descriptors: *Computer programs, *Rainfall-runoff relationships, *Urban hydrology, *Storm runoff, Urban runoff, *Simulation analysis, Rational formula.

A computer program eliminates most of the intuition or experience required in calculating stormwater runoff by the classical rational method. The program gives an approximate solution of the partial differential flow equation over the area. The area considered is divided into a grid of squares, with the elevation and soil condition (flow coefficient, initial surface retention, infiltration rate) tabulated for each grid element; often all these may be considered constant except elevation. Typical rainfall data are entered, and the program gives the runoff into drainage lines as a function of time. Depth of water standing in the area is also computed. Copies of the program are available. (Knapp-USGS)
W74-02310

DAM-BREAK FLOOD IN A PRISMATIC DRY CHANNEL,
California Univ., Davis. Dept. of Engineering.
For primary bibliographic entry see Field 08B.
W74-02311

FLOW IN OPEN CHANNELS WITH SMOOTH CURVED BOUNDARIES,
Pahlavi Univ., Shiraz (Iran). Dept. of Engineering.
For primary bibliographic entry see Field 08B.
W74-02312

DAMPING OF WATER WAVES OVER POROUS BED,
Massachusetts Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
P. L-F. Liu.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10218, p 2263-2271, December 1973. 1 tab, 14 ref, append.

Descriptors: *Waves (Water), *Porous media, *Alluvial channels, Viscosity, Sands.
Identifiers: *Damping (Water waves).

Based on linearized Navier-Stokes equations and Darcy's equations, the viscous damping of small amplitude surface waves over a permeable bed is examined. Boundary layer approximation is employed to solve the velocity field and pressure

field. By requiring that the net dissipation per period must be balanced by the slow decay of wave energy, the damping rate is found. Theory agrees fairly well with experimental results. The damping rate of a simple harmonic gravity wave over a permeable bed was studied using the boundary layer approximation. There are two possible modes of oscillation. If the porosity term is neglected, then there is only one possible mode of oscillation which is the same as that of a progressive wave over an impermeable bed. (Knapp-USGS)
W74-02315

ELEVATION DEPENDENT MODEL FOR ESTIMATING ANNUAL RUNOFF,
Wyoming Univ., Laramie. Water Resources Research Inst.
For primary bibliographic entry see Field 02A.
W74-02317

FIELD TESTS ON TRANSVERSE MIXING IN RIVERS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05B.
W74-02318

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR URBAN STUDIES IN THE HOUSTON, TEXAS METROPOLITAN AREA, 1971,
Geological Survey, Austin, Tex.
D. E. Ferguson.
Open-file report (Texas District), May 1973. 244 p, 16 fig, 14 tab, 2 ref.

Descriptors: *Urban hydrology, *Hydrologic data, *Storm runoff, *Rainfall-runoff relationships, *Texas, Cities, Watersheds (Basins), Basic data collections, Streamflow, Gaging stations, Flow rates, Reservoir storage.
Identifiers: *Houston (Tex).

Hydrologic investigations of urban watersheds in Texas were begun by the U.S. Geological Survey in 1954. This report, the eighth in a series of reports to be published annually, presents the basic hydrologic data collected in the Houston urban area for the 1971 water year (October 1970 to September 1971). Rainfall for the year was unevenly distributed over the area. Individual station totals ranged from 29.2 inches at the Sims Bayou at Hiram Clarke Street gage to 49.8 inches at the Houston-Alief rain gage. The largest amounts of rainfall for an individual storm were 7.15 inches at the Houston-Alief rain gage and 6.25 inches at the Stafford rain gage on October 11. Runoff data are based on discharge measurements and stage records at 16 continuous-record stream-gaging stations, 16 partial-record stream-gaging stations, and two reservoir-content stations. Annual records of daily discharges at continous-record stream-gaging stations, maximum discharge at crest-stage partial-record stations, and daily contents of reservoirs are given. The high-runoff periods of the 1971 water year occurred during October 1970, and August and September 1971. Only a small amount of runoff resulted from rainfall during the intervening months. (Woodard-USGS)
W74-02471

CALIFORNIA HIGH WATER, 1970-1971,
California State Dept. of Water Resources, Sacramento. Div. of Resources Development.
D. E. Martfeld, and W. A. Arvola.
Available from State of Calif., Dept. of Water Resources PO Box 388, Sacramento, Calif. 95804, Price $2.00. Bulletin No 69-71, September 1972. 51 p, 22 fig, 3 tab.

Descriptors: *Water resources, *Weather patterns, *Hydrologic data, *Peak discharge, *California, Precipation (Atmospheric), Streamflow, Runoff, Floods, Rainfall, Snow, Flood control, Reservoirs, Water levels, Discharge (Water), Stage-discharge relations.

The weather pattern in California for water year 1970-71 was marked by extremes that set several weather records. The year held the wettest November for San Francisco and Stockton, the longest winter drought at Red Bluff, the heaviest 24-hour rainfall in southern California, and the deepest snowpack at Norden in December and January. A series of storms hit the North Coastal Hydrographic Area from October through December, causing flood stages on some rivers. The San Francisco Bay Hydrographic Area was drenched by November storms that dropped almost three inches of rain on San Francisco and more than 4 inches of rain on Marin County in one 2-day period. Heavy local runoff resulted in both areas, with the Napa River near St. Helena rising 9 feet in 9 hours. No streams exceeded flood stage. November and December were very wet months in the Central Valley Hydrographic Area and large amounts of snow were deposited in the Sierra Nevada in December. The Central Valley had little rain from January to March, when a new series of storms brought heavy rain to the mountains. Both Shasta and Oroville Reservoirs prevented downstream flooding. In February a severe earthquake centered in San Fernando Valley extensively damaged the Upper and Lower San Fernando Dams. (Woodard-USGS)
W74-02474

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR LITTLE ELM CREEK, TRINITY RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
B. B. Hampton.
Open-file report (Texas District), July 1973. 47 p, 2 fig, 2 tab.

Descriptors: *Hydrologic data, *Small watersheds, *Texas, *Erosion control, Basic data collections, Rainfall-runoff relationships, Streamflow, Flow rates, Gaging stations Rain gages, Storms.
Identifiers: *Trinity River basin (Tex.), Little Elm Creek (Tex), Aubrey (Tex.).

The U.S. Soil Conservation Service is actively engaged in the installation of flood- and soil-erosion reducing measures in Texas. Hydrologic investigations of small watersheds were begun by the Geological Survey in 1951 and are now being made in 12 areas. This report, which is the 12th in a series of basic-data reports published annually for the Little Elm Creek study area, contains the rainfall, runoff, and storage data collected during the 1971 water year for the 75.5-square-mile area above the stream-gaging station Little Elm Creek near Aubrey, Texas. The locations of floodwater-retarding structures and hydrologic-instrument installations in the area are shown. Sixteen floodwater-retarding structures have a combined capacity of 12,340 acre-feet below the emergency spillway and control runoff from 35.7 square miles, or 47% of the area above the Aubrey stream-gaging station. Average rainfall during the 1971 water year was 24.52 inches, or 67% of the 15-year (1957-71) average of 36.55 inches for the area. The yearly mean discharge at the stream-gaging station near Aubrey was 3.89 cfs. The runoff for the year was 2,810 acre-feet (0.70 inch). (Woodard-USGS)
W74-02477

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR CALAVERAS AND ESCONDIDO CREEKS, SAN ANTONIO RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
R. D. Steger.
Open-file report (Texas District), 1973. 74 p, 3 fig, 4 tab.

Descriptors: *Hydrologic data, *Small watersheds, *Erosion control, *Texas, *Rainfall-runoff relationships, Storms, Flood control, Soil conservation, Data collections, Flood protection, Engineering structures, Hydrographs, Mass curves, Rain gages, Gaging stations.
Identifiers: *San Antonio River basin (Tex), Calaveras Creek, Escondido Creek.

The U. S. Soil Conservation Service is actively engaged in the installation of flood and soil-erosion reducing measures in Texas. As part of this project, hydrologic investigations of small watersheds were begun by the Geological Survey in 1951 and are now being made in 12 study areas. The mean rainfall in the Calaveras Creek study area for the 1971 water year was 20.58 inches, or 75% of the 17-year (1955-71) average. The mean annual rainfall (1931-60) at the NationalWeather Service at Karnes City is 31.93 inches. The average rainfall over the Escondido Creek study area for the 1971 water year was 19.59 inches. Only one storm was selected for detailed computations. These computations include detailed time breakdown of rainfall and discharge. Hydrographs and mass curves are drawn for illustrations. A summary of rainfall-runoff data for the storm is shown. (Woodard-USGS)
W74-02478

FLOOD OF JUNE 1972 AT CORNING, NEW YORK,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07C.
W74-02479

APPLICATION OF ERTS-1 IMAGERY TO FLOOD INUNDATION MAPPING,
Iowa State Geological Survey, Iowa City. Remote Sensing Lab.
For primary bibliographic entry see Field 07B.
W74-02591

ASSESSMENT OF FLOOD DAMAGE IN ARIZONA BY MEANS OF ERTS-1 IMAGERY,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 07B.
W74-02592

MONITORING OF STREAMFLOW IN THE VERDE RIVER BY ERTS-1 DATA COLLECTION SYSTEM (DCS),
Geological Survey, Phoenix, Ariz. Water Resources Div.
For primary bibliographic entry see Field 07B.
W74-02594

PRELIMINARY EVALUATION OF ERTS-1 FOR DETERMINING NUMBERS AND DISTRIBUTION OF PRAIRIE PONDS AND LAKES,
Environmental Research Inst. of Michigan, Ann Arbor.
For primary bibliographic entry see Field 07B.
W74-02597

DYNAMICS OF PLAYA LAKES IN THE TEXAS HIGH PLAINS,
Texas Tech Univ., Lubbock. Dept. of Geosciences.
For primary bibliographic entry see Field 07B.
W74-02598

STORM RAINFALL IN THE CARPATHIANS IN JUNE 1969,
Ukrainskii Nauchno-Issledovatelskii Gidrometeorologicheskii Institut, Kiev (USSR).
For primary bibliographic entry see Field 02B.
W74-02606

FLOODS AT MARTINSBURG AND VICINITY, WEST VIRGINIA,
Geological Survey, Washington, D.C.
G. S. Runner, and E. A. Friel.
Hydrologic Investigations Atlas HA-427, 1 sheet, 1973. 8 fig, 1 map, 2 ref.

Descriptors: *Floods, *Flood data, *West Virginia, Hydrologic data, Historic floods, Streamflow, Runoff, Flow rates, Gaging stations, Peak discharge, Flood profiles, Flood frequency, Maps, Planning, Land use, Aerial photography, Appalachian Mountain Region.
Identifiers: *Martinsburg area (W Va).

This one-sheet atlas was prepared to further the objectives of the Appalachian Regional Commission. It presents hydrologic data concerning the extent, depth, and frequency of flooding that are useful for an appraisal of the hazards involved in occupancy and development of flood plains along Opequon and Tuscarora Creeks in the vicinity of Martinsburg, West Virginia. It will aid those who are responsible for making decisions for the safe and economical use of floodplain lands along these creeks. The data will be useful for preparing building and zoning regulations, developing recreational areas, and purchasing and developing unoccupied land for various uses. The map and flood data provide a technical basis for making decisions leading to land uses compatible with the degree and frequency of flooding expected. The approximate boundaries of inundation on Opequon and Tuscarora Creeks by hypothetical floods having recurrence intervals of 5,25, and 50 years are delineated on an aerial photomosaic map. Depths of inundation and limits of overflow of floods of various magnitudes can be estimated by using the methods and relations presented. (Woodard-USGS)
W74-02615

FLOOD CONTROL PROJECT MAINTENANCE AND REPAIR--1970 INSPECTION REPORT,
California State Dept. of Water Resources, Sacramento.
J. F. Wright, Jr., and J. MacClanahan.
Available from State of Calif, Documents Section, P.O. Box 20191, Sacramento, Calif. 95820 Price $2.00. Bulletin No 149-70, May 1971. 30 p, 2 fig, 8 tab.

Descriptors: *Flood control, *Levees, *River basins, *California, Engineering structures, Maintenance, Channel improvement, Check structures, Flood protection, Maps, Sites, Erosion control, Vegetation, Projects, Network design.
Identifiers: *Sacramento and San Joaquin Valleys (Calif.).

In 1970, flood control levees extending 1,537 miles were operated under cooperative state and federal agreements in the Sacramento and San Joaquin Valleys and in Lake and Placer Counties, Calif. Flood control projects include the Sacramento, American, San Joaquin, Calaveras, and Truckee Rivers; Littlejohns and Middle Creeks; Merced County Stream Group; Sacramento River Bank Protection Project, and the Lower San Joaquin Flood Control Project; and the Fresno County Stream Group. Twice during 1970, Department of Water Resources specialists rated the quality of levee maintenance performed by local maintaining agencies. This bulletin reports both the 1970 ratings and the method of rating, discusses proper maintenance procedures, and reports levee construction by the U. S. Army Corps of Engineers, channel maintenance, applications for levee encroachments, and the condition of the flood control project structures. Maps locate project levees and local maintenance agencies. (Woodard-USGS)
W74-02617

WATER RESOURCES OF THE BIG SIOUX RIVER VALLEY NEAR SIOUX FALLS, SOUTH DAKOTA,
Geological Survey, Washington, D.C.
D. G. Jorgensen, and E. A. Ackroyd.
Available from GPO, Washington, DC 20402 Price $2.05 (paper copy). Water-Supply Paer 2024, 1973. 50 p, 22 fig, 6 tab, 27 ref.

Descriptors: *Water resources, *Hydrologic data, *Surface waters, *Groundwater resources, *South Dakota, Hydrogeology, Aquifer characteristics, Water wells, Withdrawal, Water yield, Water quality, Streamflow, Base flow, Water supply, Projections, Model studies, Surface-groundwater relationships.
Identifiers: *Big Sioux River Valley (S Dak), *Sioux Falls (S Dak).

The major sources of water in the Big Sioux River Valley between Sioux Falls and Dell Rapids, S. Dak., are the Big Sioux River and the glacial outwash aquifer beneath the flood plain. The river and the aquifer are hydraulically connected. To evaluate the importance of the aquifer in the hydrologic system, both an electrical analog and a digital model were programmed for storage depletion alone. These models were used to determine the water-level declines in the aquifer that would result from 1 year of withdrawal at a rate of 9-10 million gallons per day. Both models indicated that the existing well field can yield water at that rate for more than 1 year. The analog model was also used to determine the maximum average daily yield of the aquifer-river system for a 2-year period modeled for the minimum recorded stream discharge and for streambed infiltration as the only recharge. The maximum average yield under these conditions would be less than 24 mgd. Most of the water pumped during this period would be from aquifer storage. Water from the river is generally less mineralized, softer, and easier to treat than groundwater. Water pumped from wells near the river is similar in quality to the river water, but does not have the objectionable odors or tastes often present in water from the river. (Woodard-USGS)
W74-02619

NEW VISTAS FOR FLOOD INVESTIGATIONS,
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
V. Yevjevich.
Accademia Nazionale Dei Lincei, Rome, Problemi Attuali di Scienza e di Cultura, Quaderno No 169, p 515-546, 1972. 25 fig, 8 ref.

Descriptors: *Floods, *Flood forecasting, *Flood frequency, *Mathematical studies, Equations, Hydrologic data, Methodology, Flood data, Rainfall, Runoff, Statistical methods, Probability, Hydrographs, Mass curves.

Mathematical approaches to flood data investigations are described under the following main categories: properties of basic data for analysis of floods; general properties of floods; extraction of information on floods from rainfall data; extraction of information on floods from runoff data; prediction of floods; probability distribution of floods; and statistical inference for flood events. (Woodard-USGS)
W74-02625

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR GREEN CREEK, BRAZOS RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
For primary bibliographic entry see Field 04D.
W74-02626

DETAILED ANALYSIS OF SHORT-TERM VARIATIONS IN BEACH MORPHOLOGY (AND CONCURRENT DYNAMIC PROCESSES) FOR SUMMER AND WINTER PERIODS, 1971-1972, PLUM ISLAND, MASSACHUSETTS,
Massachusetts Univ., Amherst. Coastal Research Center.
R. W. Abele, Jr.
Available from NTIS as AD-759 513. Final Report prepared for Department of the Army, November 1972. 174 p, 59 fig, 1 tab, 23 ref. DACW72-71-C-0023.

Descriptors: *Massachusetts, *Waves (Water), *Beach erosion, Ocean waves, Atmospheric pressure, Intertidal areas, Water level, Storms, *Sediment transport, *Shallow water, *Geomorphology, Coasts, Barrier islands, *Meteorology.
Identifiers: *Plum Island (Mass), Breakers, Longshore currents, Nearshore bars, Air-sea interaction.

An analysis of the relationship between wave and meteorological variables and beach morphology was undertaken during summer and winter periods, 1971 and 1972, on Plum Island, Massachusetts. Fifteen variables were measured or computed bihourly, twenty-four hours per day, throughout both study periods. These variables were wave period, wave height, breaker type, breaker angle, longshore current velocity, wave steepness, breaker power, wind speed and direction, barometric pressure, air and water temperature, and ground-water elevation. Daily topographic maps of the intertidal zone were constructed for twelve beach profiles spaced at 60-m intervals. Variations in beach process variables, during both the summer and winter periods, were directly related to the passage of high- and low-pressure systems and to the proximity of the system to Plum Island. With an increase in breaker power and breaker steepness, the high-tide beachface gradient increased. Increases in breaker power also resulted in a rise in the level of the ground-water surface. Although most process variables operated in a similar fashion for the summer and winter periods, strong offshore winds and extreme low temperatures that accompany polar high-pressure systems are unique to the winter period. Differences in beach morphology within a small area appear to reflect the state of recovery of the beach profiles following a storm. Adjacent profiles at different stages of maturity are controlled by the proximity of the nearshore bar. The closer the bar is to shore, the more quickly sediment can be returned to the beach zone following a storm. (Sinha-OEIS)
W74-02649

2F. Groundwater

GROUND WATER SEEPAGE PATTERNS TO WELLS FOR UNCONFINED FLOW--PHASE II,
Iowa State Water Resources Research Inst., Ames.
M. Y. Khan, and D. Kirkham.
Available from NTIS as PB-226 089 $5.50 in paper copy, $1.45 in microfiche. Completion Report ISWRRI-57, August 1973. 63 p, 12 fig, 9 tab, 22 ref. OWRR B-019-IA (5).

Descriptors: *Aquifers, *Groundwater movement, *Ditches, *Free surfaces, *Saturated flow, Model studies, Equations, Computer programs, Hydraulic conductivity, Analytical techniques.
Identifiers: *Parallel ditches, Unconfined flow, Two-dimensional groundwater mounds, Three-dimensional groundwater mounds.

Analytical methods have been developed, for steady-state unconfined flow, for determining the exact location of the free surface in a two-dimensional flow of groundwater between two parallel ditches. The analysis considers flow in a saturated region below the watertable; capillary effects are neglected. The analysis of a two-dimensional flow can be carried over to determine the location of the free surface in a three-dimensional axisymmetric flow toward a well. The solution has been obtained from potential theory by solving Laplace's equation to satisfy an appropriate set of boundary conditions using a modified Gram-Schmidt technique and a simple iterative scheme. The solution is given in the form of a potential function and

a stream function. These functions can be used to determine the exact location of the free surface and to draw flownets. Computer programs have been developed to determine the location of the free surface and to draw flownets. Several flownets are presented. (See also W70-02759) (Woodard-USGS)
W74-02206

STRONTIUM, CALCIUM AND THE ISOTOPIC COMPOSITION OF STRONTIUM IN UNDERGROUND WATERS FROM THE SCIOTO RIVER BASIN, OHIO,
Miami Univ., Oxford, Ohio. Dept. of Geology.
A. M. Stueber, A. D. Baldwin, M. Ikramuddin, and P. Pushkar.
Available from the National Technical Information Service as PB-226 104, $3.00 in paper copy, $1.45 in microfiche. Final Report, 1973. 38 p, 7 fig, 5 tab, 11 ref. OWRR A-030-OHIO (1). 14-31-0001-3835.

Descriptors: *Groundwater, *Isotope studies, *Strontium, *Tracers, Groundwater-surface relationships, *Ohio, Tagging, Provenance, Glaciohydrology
Identifiers: *Scioto River basin (Ohio), Sr/Ca ratios, Celestite.

A total of 27 ground-water samples from the Scioto River drainage basin, Ohio has been analyzed for Sr and Ca concentrations and Sr-isotopic compositions. Ground waters which emanate from carbonate bedrock are characterized by 87Sr/86Sr ratios in the range 0.708-0.709; unusually high Sr/Ca ratios in these waters identify celestite lenses within the carbonate as the dominant source of Sr. Underground waters from clastic bedrock, principally shale, have 87Sr/86Sr ratios which vary from about 0.710 to about 0.713, and low Sr/Ca ratios. Thus there are two basic ground-water types from bedrock within the basin which can be identified by these two parameters. Most ground waters that have been in contact only with glacial overburden, which covers the northern two-thirds of the basin, have carbonate-type 87Sr/86Sr ratios as well as high Sr/Ca ratios. Celestite is apparently present in the till throughout much of the Scioto basin. Ground waters containing celestite-derived Sr, whether from the carbonate bedrock or the glacial overburden, have such high strontium concentrations as to completely establish the 87Sr/86Sr ratios of surface waters north of the glacial boundary and limit the usefulness of this parameter as a tracer in water studies within the basin.
W74-02218

FLOW ANALYSIS OF HYDRAULIC CONNECTORS IN ARTIFICIAL RECHARGE SYSTEMS, A MODEL STUDY,
Ohio State Univ., Columbus. Water Resources Center.
For primary bibliographic entry see Field 04B.
W74-02219

SATURATED-UNSATURATED SEEPAGE BY FINITE ELEMENTS,
Volcani Inst. of Agricultural Research, Bet-Dagan (Israel). Dept. of Soil and Water.
For primary bibliographic entry see Field 02G.
W74-02313

DAMPING OF WATER WAVES OVER POROUS BED,
Massachusetts Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
For primary bibliographic entry see Field 02E.
W74-02315

STUDIES ON SEEPAGE FROM CANALS WITH PARTIAL LINING,
Indian Inst. of Tech., Kanpur. Dept. of Civil Engineering.
For primary bibliographic entry see Field 04A.
W74-02319

GEOLOGIC CONTROL OF GROUND WATER MOVEMENT IN A PORTION OF THE DELAWARE PIEDMONT,
Delaware Univ., Newark. Dept. of Geology.
R. R. Jordan, and W. M. Leis.
Available from the National Technical Information Service as PB-226 093, $2.75 in paper copy, $1.45 in microfiche. Completion Report, October 1973. 19 p, 8 fig, 2 tab, 7 ref. OWRR A-021-DEL (1). 14-31-0001-3808.

Descriptors: *Groundwater movement, *Structural geology, Magnetic studies, Seismic studies, Delaware, *Permeability, Pumping, *Porosity, *Exploration, *Geologic control, Geophysics.
Identifiers: *Delaware Piedmont, Axes of permeability, Residual magnetics.

Geologic and geophysical exploration as well as pumping tests in the Delaware Piedmont define two axes of permeability in ground-water flow. The predominant axis parallels strike of regional foliation with conduits provided by sheet joints. Zones of relatively high secondary porosity were defined based upon study techniques.
W74-02320

A GUIDE TO IMPORTANT CHARACTERISTICS AND VALUES OF FRESHWATER WETLANDS IN THE NORTHEAST.
Massachusetts Univ., Amherst. Dept. of Forestry and Wildlife Management.
For primary bibliographic entry see Field 04B.
W74-02324

USE OF DIGITAL COMPUTER TECHNIQUES IN WATER RESOURCES DATA STORAGE,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
For primary bibliographic entry see Field 04B.
W74-02357

THE ROLE OF DEFORMATION IN CHANGING THE RESERVOIR PROPERTIES OF AQUIFERS,
Montana Univ., Missoula. Dept. of Geology.
G. W. Crosby.
Available from National Technical Information Service as PB-226 197 $3.00 in paper copy, $1.45 in microfiche. Research Report No. 42, Montana University Joint Water Resources Research Center, Bozeman, (1973) 8 p, 3 fig. OWRR A-036-MONT (1).

Descriptors: Groundwater, *Deformation, *Aquifer characteristics, *Hydrogeology, *Groundwater reservoirs, *Montana.
Identifiers: *Sawtooth Range (Mont).

The purpose has been to quantitatively determine the role of deformation in changing the physical properties of rocks: more specifically, an attempt has been made to assess the possible damage by deformation to aquifers. The near subsurface of perhaps 25 percent of the area of the United States consists of moderate to severely deformed rocks. Moreover, much of the dry southwest is underlain by deformed strata, and lacking surface water, the location of groundwater reserves is of considerable economic importance. The investigation was undertaken in the disturbed belt adjacent to the Sawtooth Range in Montana. The disturbed belt is a transition zone from flat-lying underformed strata of the plains to severely deformed rocks of the fold and thrust belt in the Sawtooth Range. (Holje-Montana)
W74-02446

A CONJUNCTIVE USE SURFACE WATER--GROUND WATER SIMULATOR,
New Mexico Inst. of Mining and Technology, Socorro. Dept. of Geoscience.
W. Brutsaert, and C. Way.
Available from the National Technical Information Service as PB-226 254, $3.50 in paper copy, $1.45 in microfiche. New Mexico Water Resources Research Institute Partial Technical Completion Report No 033, November 1973. 56 p, 9 fig, 1 tab, 7 ref, append. OWRR A-045-NMEX (1).

Descriptors: *Computer models, *Aquifers, *Conjunctive use, *Computer simulation, *Groundwater flow, Groundwater recharge, Groundwater, Unconfined aquifers, Seepage, Leakage, Phreatophytes, Precipitation, Storage coefficient, Hydraulic conductivity.
Identifiers: *Rio Grande Region, *Gauss-Elimination, *Line successive over relaxation, New Mexico, Continuous and descretized mass balance, Thomas Algorithm, Residual approach.

As part of an interdisciplinary analysis of the economic evaluation of the water resources of the Rio Grande Region of New Mexico, a conjunctive use surface water-ground water simulator was developed. The simulator was used to determine the dynamic availability of ground water and its relationship to flow in the Rio Grande. The structure and use of the simulator are described. The simulator is a computer model in which the governing nonlinear parabolic partial differential equation, used to simulate unconfined aquifer flow in two dimensions, was solved by implicit finite differences. The set of difference equations in residual form are solved by the line successive over relaxation method or Gauss Elimination depending upon the size of the problem. (Welker-New Mexico)
W74-02452

DISPERSION OF SUBSTANCES FROM WELL RECHARGE OPERATIONS IN AN ANISOTROPIC, HOMOGENEOUS CONFINED AQUIFER,
Wisconsin Univ., Madison. Dept. of Civil and Environmental Engineering.
J. A. Hoopes, P. L. Monkmeyer, and Q. N. Fattah.
Available from the National Technical Information Service as PB-226 287, $3.50 in paper copy, $1.45 in microfiche. Wisconsin Water Resources Center, Madison, Technical Report, 1973. 52 p, 15 fig, 35 ref, 2 append. OWRR A-043-WIS (1) 14-31-0001-3550 and 14-31-0001-3850.

Descriptors: *Dispersion, *Recharge wells, *Anisotropy, Water quality, Waste water disposal, Homogeneity, *Porosity, *Aquifers, Model studies, *Groundwater movement.

The first part of the investigation concerns the development of experessions which related the dispersion coefficient for flows through anisotropic, homogeneous porous media to the fluid, flow, and media properties. These expressions are developed from one-dimensional flow experiments on an anisotropic media model constructed of thin alternating layers of different sized sand. In the second part of the study, dispersion of substances in the flow from a partially-penetrating, recharge well through a confined homogeneous, anisotropic aquifer is investigated. Theoretical distributions of a substance added to the steady flow from the well are being determined from numerical solutions of the mass conservation equation, where the flow field is determined from potential flow analysis and dispersion coefficients are obtained from the results of the first part of the investigation. Measurements of a tracer distribution will be carried out on a laboratory model, consisting of a cylindrical element of anisotropic porous media constructed as described above, and compared to the theoretical predictions. From these results, the importance of dispersion in flow through anisotropic confined aquifers will be determined, and the validity of the theoretical

model in investigating other complex well flow patterns will be evaluated.
W74-02454

UNSTEADY DRAWDOWN AT A PARTIALLY PENETRATING WELL IN A TRANSVERSELY ISOTROPIC ARTESIAN AQUIFER,
University Coll. of Engineering, Hyderabad (India). Dept. of Civil Engineering.
For primary bibliographic entry see Field 04B.
W74-02466

AERIAL REMOTE SENSING OF CARBONATE TERRANES IN SHELBY COUNTY, ALABAMA,
Geological Survey, University, Ala.
For primary bibliographic entry see Field 07B.
W74-02467

GROUND-WATER RECHARGE FOR URBAN USE: LEAKY ACRES PROJECT,
Agricultural Research Service, Fresno, Calif. Ground Water Recharge Field Station.
For primary bibliographic entry see Field 04B.
W74-02468

SHALLOW GROUND WATER IN THE ZAMIN DAWAR AREA, HELMAND PROVINCE, AFGHANISTAN,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 04B
W74-02472

A HYDROGEOTHERMAL DESCRIPTION OF GROUNDWATER IN UPPER CRETACEOUS DEPOSITS IN THE SOUTHEAST ARAL SEA AREA (GIDROGEOTERMICHESKAYA KHARAKTERISTIKA PODZEMNYKH VOD VERKHNEGO MELA YUGO-VOSTOCHNOGO PRIARAL'YA),
Akademiya Nauk Uzbekskoi SSR, Tashkent. Institut Seismologii.
S. E. Ergashev.
Uzbekskiy Geologicheskiy Zhurnal, No 1, p 76-78, 1973. 1 fig, 2 ref.

Descriptors: *Groundwater, *Geothermal studies, *Temperature, Thermocline, Thermal water, Borehole geophysics, Structural geology, Geologic time, Aquifers, Water quality.
Identifiers: *USSR, *Aral Sea area, *Cretaceous period, Tectonics.

Four hydrogeothermal regions southeast of the Aral Sea were identified on the basis of groundwater temperatures. The first region characterized by low temperatures (18-25 deg C) is confined to the Amu-Dar'ya arch and the Sultanuizdag-Bukantau horst anticlinal zone. The depth of groundwater occurrence is 3 to 15 m. The second region with moderately warm waters (25-30 deg C) is confined to the zone of the Buzgul'skiy arch. The third region with warm waters (28-35 deg C) belongs to the Tadzhikazganskiy Depression. The fourth region with high groundwater temperatures (28-56 deg C) is confined to the South Aral Sea Depression. The increase in groundwater temperature depends largely on depth of occurrence of water-bearing rocks and on structural and tectonic conditions of the area. The normal geothermal gradient for groundwater of the area is 3.0-3.5 deg C per 100 m in peripheral sections and 4.5-5.0 deg C in central parts. Thermal water of the South Arel Sea Depression can be used to heat greenhouses, schools, hospitals, and other buildings. (Josefson-USGS)
W74-02609

SOME PROBLEMS IN AGE DETERMINATION OF GROUNDWATER (NEKOTORYYE VOPROSY RASCHETA VOZRASTA PODZEMNYKH VOD),
Akademiya Nauk Uzbekskoi SSR, Tashkent. Institut Seismologii.
A. I. Spiridonov, A. N. Sultankhodzhayev, B. A. Beder, R. N. Taneyev, and V. G. Tyminskiy.
Uzbekskiy Geologicheskiy Zhurnal, No 3, p 38-40, 1973. 1 tab, 4 ref.

Descriptors: *Groundwater, *Age, *Radioactive dating, *Geologic time, *Gases, Argon, Helium, Aquifers, Investigations.
Identifiers: *USSR, Radon.

Results are presented of investigations of excess argon in free and dissolved gases of the Amu-Dar'ya artesian basin. Age determinations of groundwater in Lower Cretaceous and Jurassic deposits by He/Rn and He/Ar methods and by the He/Ar method corrected for Ar-40 are tabulated. (Josefson-USGS)
W74-02611

WATER RESOURCES OF THE BIG SIOUX RIVER VALLEY NEAR SIOUX FALLS, SOUTH DAKOTA,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 02E.
W74-02619

GROUNDWATER RESOURCES OF VAL VERDE COUNTY, TEXAS,
Geological Survey, Austin, Tex.
R. D. Reeves, and T. A. Small.
Texas Water Development Board Report 172, June 1973. 144 p, 18 fig, 7 tab, 50 ref.

Descriptors: *Groundwater resources, *Water wells, *Aquifer characteristics, *Water utilization, *Texas, Well data, Water yield, Water levels, Water quality, Chemical analysis, Hydrogeology, Groundwater movement, Surface-groundwater relationships, Streamflow, Lakes, Drillers logs, Basic data collections.
Identifiers: *Val Verde County (Tex).

The principal water-bearing unit in Val Verde County, Texas, is the Edwards and associated limestones. Nearly all of the water used in the county is obtained from groundwater sources. A total of about 1,850 acre-feet or 1.7 mgd of water was pumped from wells in 1969. About 1,200 acre-feet (1.1 mgd) was used for rural-domestic supply and livestock, about 600 acre-feet (0.5 mgd) was used for irrigation, and 50 acre-feet (0.04 mgd) was used for municipal supply. A small but undetermined amount of water was pumped for industrial use. The city of Del Rio uses water from San Felipe Springs for its municipal supply; in 1969 the city used 6,780 acre-feet (6.0 mgd). Additional large supplies of groundwater are available for development. An average of about 500,000 acre-feet per year is discharged from the Edwards and associated limestones through springs and seeps. The chemical quality of the groundwater suitable for most uses except in the extreme southeastern part of the county. (Woodard-USGS)
W74-02620

HYDROGEOLOGIC ASPECTS OF A PROPOSED SANITARY LANDFILL NEAR OLD TAMPA BAY, FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 05E.
W74-02628

2G. Water in Soils

EXPERIMENTAL AND PREDICTED MOVEMENT OF THREE HERBICIDES IN A WATER-SATURATED SOIL,
Oklahoma State Univ., Stillwater. Dept. of Agronomy.
For primary bibliographic entry see Field 05B.
W74-02156

EFFECT OF FEEDLOT MANURE ON SOIL AND WATER QUALITY,
Department of Agriculture, Lethbridge (Alberta). Research Station.
For primary bibliographic entry see Field 05B.
W74-02157

INFLUENCE OF SOIL STRUCTURE AND MOISTURE ON NITRIFICATION,
Komenskeho Universita, Bratislava (Czechoslovakia). Dept. of Microbiology.
L. Simon.
Acta Fac Rerum Nat Univ Comenianae Microbiol. 1 p, 87-97. 1971. Illus.
Identifiers: *Nitrification, *Soil structure, *Soil moisture, Aggregates.

The intensity of nitrification of structural aggregates of the soil depends on the size of the aggregate and the degree of moisture. Mesoaggregates of small size (0.1-1.4 mm) permit maximal nitrification. Larger mesoaggregates (2-6 mm) permit a higher degree of nitrification at all degrees of moisture than microaggregates (< 0.2 mm). At a moisture content of 40% and maximal capillary capacity, nitrification depends not so much on the size of the aggregate as on the moisture content; hence, the moisture content is the most suitable for the comparison of soil nitrification in various structures. For nitrification purposes a moisture content of 80 or 100% in the soil had adverse effects.--Copyright 1973, Biological Abstracts, Inc.
W74-02192

A SELF-DRAINING SUBSURFACE RAINFALL CONSERVATION SYSTEM: ITS EFFECT ON THE SOIL WATER STATUS AND PRODUCTIVITY OF COASTAL PLAINS SANDS,
Rhodesia Univ., Sailsbury. Dept. of Agriculture.
D. A. Russell.
Soil Sci. Vol 114, No 3, p 234-238. 1972. Illus.
Identifiers: *Coastal plains, Design, Rainfall, *Sands, Soil water movement, *Subsurface drainage, Trough, Water conservation.

A water control system was established to provide simultaneously for both rainfall and nutrient conservation and drainage of excess water, with the capability of providing for crop needs over the growing season. The approach adopted was to establish a perched water table, which would be self-draining to a predetermined level when the free water level rose above that mark. To achieve the desired conditions the system consisted of a U-shaped subsurface trough operated in a manner analogous in some respects to the wick-siphon principles. The structure and use of the trough are described. Laboratory and field tests were performed. By applying the principles of soil water movement to a subsurface trough design, water and nutrient conservation, and excess water drainage can be incorporated in a single practice. This reduces drought damage hazard to crops and provides a marked increase in the productivity of sandy soils.--Copyright 1973, Biological Abstracts, Inc.
W74-02193

INFLUENCE OF THE SOIL WATER LEVEL ON MICROBIAL PROCESSES OF PASTURE AND FOREST COMMUNITIES,
Komenskeho Universita, Bratislava (Czechoslovakia). Dept. of Geobotany.
A. Frano.
Acta Fac Rerum Nat Univ Comenianae Microbiol. 1 p, 39-51. 1971. Illus.
Identifiers: Cellulose degradation, *Forests, Humus, *Microbial processes (Soil), Nitrification, *Pastures, *Soil water.

The direct influence of the water level is an inhibition of soil microbiological processes and an accumulation of organic elements. Humus formation exceeds mineralization. Where the water level effects the soil profile only by the activity of capillary water attraction to the surface, microbiological processes achieve maximal intensity and nearly equivalent mineralization. The intensity of both nitrification and cellulose degradation is much higher in forest than in pasture communities, but the biologic activity of the latter is much higher.--Copyright 1973, Biological Abstracts, Inc.
W74-02194

FACTORS AFFECTING THE MANGANESE STATUS IN SOILS OF THE U.A.R.,
Ain Shams Univ., Cairo (Egypt). Dept. of Soils.
A. H. El-Damaty, H. Hamdi, and A. A. Orabi.
U A R J Soil Sci. Vol 11, No 1, p 7-26. 1971. Illus.
Identifiers: Calcium carbonate, *Manganese, Minerals, Nutrients, *Rice, Soils, *United Arab Republic, Waterlogging, *Soil chemical properties.

The status of available Mn, in some soils of the United Arab Republic as influenced by soil reaction, organic matter and CaCO3 contents, the mechanical components and the waterlogging was studied. The different forms studied were water-soluble, exchangeable, easily-reducible and total Mn. Water-soluble Mn was absent from all samples. Alluvial soils contain fairly high amounts of the chemically available Mn, ie., the active form which is quite sufficient to support normal plant growth. These soils are rich in total Mn because of the annual sedimentation of the solid matter transported by the Nile on to the valley. Sandy and calcareous soils contain less amounts of active and total Mn than do the typical alluvial soils. The ratio of active to total Mn is less in these soils than in the alluvial ones. Highly significant positive correlation was observedbetween each of the different forms of Mn and the organic matter content, silt percentage and clay percentage. The organic matter exerted the greatest influence on active Mn as the correlation coefficient reached 0.76. A highly significant negative correlation was observed between the different forms of Mn and the soil pH value, in spite of the narrow range in which these values lie. After the selected soils were exposed to continuous waterlogging for 45 days the exchangeable Mn was almost doubled. The water-soluble form, which was absent before waterlogging, reached 4 ppm in some cases. The easily-reducible form also increased. The dry matter yield of rice plants grown on submerged soil was higher than on the unsubmerged ones. Mn concentration in rice plants as well as their total Mn content increased due to continuous waterlogging.--Copyright 1973, Biological Abstracts, Inc.
W74-02200

SOIL POLLUTION FROM CATTLE FEEDLOTS IN GEORGIA,
Georgia Univ., Athens. Dept. of Agronomy.
For primary bibliographic entry see Field 05B.
W74-02210

THE EFFECTS OF TRACE METALS ON GROUND WATER QUALITY AS INFLUENCED BY SOILS REFLECTING DIFFERENCES IN ORGANIC MATTER CONTENT AND GENETIC CONDITIONS,
Tuskegee Inst., Ala.
For primary bibliographic entry see Field 05B.
W74-02211

MIGRATION OF SUBSTANCES WITH SURFACE AND GRAVITATIONAL WATERS IN SOILS OF GEOCHEMICALLY RELATED LANDSCAPES OF BARABA, (MIGRATSIYA VESHCHESTV S PVERKHNOSTNYMI I GRAVITATSIONNYMI VODAMI V POCHVAKH GEOKHIMICHESKI SOPRYAZHENNYKH LANDSHAFTOV BARABY),
Akademiya Nauk SSSR, Moscow. Pochvennyi Institut.
N. I. Bazilevich, and V. M. Kurachev.
Pochvovedeniye, No 11, p 3-16, 1972. 6 tab, 8 ref.

Descriptors: *Saline soils, *Salts, Movement, *Surface waters, *Gravitational water, Groundwater, Soil types, Soil groups, Soil horizons, Soil profiles, Bogs, Inorganic compounds, Leaching, Water table, Lysimeters.
Identifiers: *USSR (Baraba Lowlands), Solonetzes, Solods, Solonchaks.

Investigations were carried out in the northern part of the Chany Depression in the Baraba Lowland to study movement of chemical substances in solonetzic, solodized, and bog soils on runoff plots and in open lysimeters. Seasonal migration of salts and desolonetzization of the B horizon were established together with solodization of the A and B1 horizons (migration of SiO2, R203, C, and suspensions), and silicification and leaching of suspensions and R203 into the B2 or B/C horizons. A part of the salts, mineral substances, and C were leached into groundwater in the solodized soils. (Josefson-USGS)
W74-02300

WATER REGIME OF SOLONCHAK SOLONETZES IN OPEN AREAS OF FORESTS IN THE NORTH CASPIAN SEA REGION, (VODNYY REZHIM SOLONCHAKOVYKH SOLONTSOV NA POLYANAKH LESNYKH NASAZHDENIY SEVERNOGO PRIKASPIYA),
I. N. Olovyannikova.
Pochvovedeniye, No 11, p 44-55, 1972. 3 fig, 5 tab, 8 ref.

Descriptors: Soil physics, *Soil moisture, *Evapotranspiration, *Soil-water-plant relationships, *Forests, Vegetation, Hydrologic cycle, Water loss, Drying, Moisture deficit, Root zone, Root distribution, Root development, Wetting, Snow, Sinks.
Identifiers: *USSR (North Caspian Sea region), *Solonetzes, *Solonchaks.

To study water regime of Solonchak Solonetzes in open areas of forests in the semidesert of the North Caspian Sea region, investigations were carried out on virgin Solonchak Solonetz and on dark-colored soil of sinks (1966-69), and on Solonetzes in openings between trees planted in 1952 (1963-68). Soil moisture content was determined to the rooting depth monthly during the growning season and to the water table in spring and autumn. Additional wetting through accumulation of snow on open areas produced a radical change in the water regime of Solonchak Solonetzes, resulting in desalinization and desclonetzization of these soils. An increase in wetting depth and soil water storage in spring contributed to growth of a luxuriant grass cover on Solonetzes in open areas. Depth of rooting of well-developed plants and depth of soil drying were greater in the open than in virgin Solonetz. Water loss from open areas during a growing season exceeded that from virgin Solonetzes by a factor of 1.5-3 and approached the amount of water lost by steppe vegetation of sinks. (Josefson-USGS)
W74-02301

MOISTURE REGIME OF SOUTHERN CHERNOZEM WITHIN SHELTERBELTS, (REZHIM VLAZHNOSTI YUZHNOGO CHERNOZEMA V SISTEME LESNYKH POLOS),
Tomsk State Univ. (USSR). Kafedra Pochvovedeniya i Agrokhimii.
V. D. Konstantinov.
Pochvovedeniye, No 11, p 56-67, 1972. 3 fig, 2 tab, 16 ref.

Descriptors: *Soil moisture, *Soil water movement, *Chernozems, *Shelterbelts, *Trees, Snowpacks, Water storage, Water balance, Water loss, Curves.
Identifiers: Chronoisopleths, *USSR (Kokchetav Oblast).

To study the effect of shelterbelts on items in the water regime of soil, investigations were carried out in 1967-69 on southern calcareous Chernozems in the Ubogan-Ishim watershed in western Kokchetav Oblast. Effectiveness of shelterbelts in North Kazakhstan should be evaluated from the standpoint of their environmental effects in winter and early summer. The effect of shelterbelts on soil moisture conditions varies areally and is most beneficial at a distance of 30-50 m from the forest edge. Soil moisture conditions in shelterbelts are optimal in April-May or April to early June, after which they deteriorate rapidly. By mid-June soil moisture in the root zone is usually exhausted. During and after this period trees draw their water from atmospheric precipitation and from deeper soil layers. Moisture exchange under trees is active to a depth of 1.5-2 m and is still significant to a depth of 2.5-3 m and even 4 m in some years. Moisture in these deeper soil layers plays an important role in the water regime of Chernozems located within shelterbelts. (Josefson-USGS)
W74-02302

DESIGN, OPERATION, AND TEMPERATURE SENSITIVITY OF A THERMOCOUPLE PSYCHROMETER MOISTURE POTENTIOMETER BASED ON THE PELTIER EFFECT, (KONSTRUKTSIYA, METODIKA PRIMENENIYA I TEMPERATURNAYA CHUVSTVITEL'NOST' TERMOPARNOGO PSIKHROMETRICHESKOGO VLAGOPOTENTSIOMETRA, OSNOVANNOGO NA EFFEKTE PEL'T'YE),
Agrofizicheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
A. M. Globus.
Pochvovedeniye, No 11, p 117-124, 1972. 4 fig, 2 tab, 6 ref.

Descriptors: *Potentiometers, *Moisture meters, Moisture content, *Temperature, *Hygrometry, Measurement, Calibrations, Humidity, Atmosphere, Temperature control, Richards apparatus, Curves.
Identifiers: *USSR, *Thermocouple psychrometers, *Peltier effect, Moisture potential.

The psychrometer method of determining the chemical potential of water in soil and plant parts is examined. Design principles for a psychrometer moisture potentionmeter based on the Peltier effect are justified, and construction of the instrument, its operation, and sensitivity characteristics are described. (Josefson-USGS)
W74-02303

INVESTIGATION OF THE RELATION BETWEEN MOISTURE POTENTIAL AND 'REDUCED FILM THICKNESS' FOR DISPERSE SYSTEMS WITH NONPOROUS PARTICLES, (ISSLEDOVANIYE ZAVISIMOSTI MEZHDU POTENTSIALOM VLAZHNOSTI I 'PRIVEDENNOY TOLSHCHINCY PLENKI' DLYA DI SPERSNYKH SISTEM S NEPORISTYMI CHASTITSAMI),
Agrofizicheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
V. M. Sirotkin, S. V. Nerpin, and M. R. Ginzburg.
Pochvovedeniye, No 11, p 125-131, 1972. 4 fig, 13 ref.

Descriptors: *Soil physics, *Moisture content, *Dispersion, *Films, *Surfaces, Particle size, Quartz, Curves, Equations.
Identifiers: USSR, Disperse systems, *Moisture potential.

The relation between moisture potential and 'reduced film thickness' can be considered unique for disperse systems with different specific surfaces provided numerical values of the specific surfaces of systems exceed 100 sq m/g. Curves of this relation for disperse systems with smaller specific surfaces can be found from data on particle-size distribution using the proposed computation method. Theoretical cuves of the relation, constructed according to the proposed method, agree well with experimental data obtained for quartz powder separates with different specific surfaces. (Josefson-USGS)
W74-02304

AN AIRBORNE GAMMA SURVEY OF MOISTURE CONTENT IN THE SURFACE DETENTION LAYER, (SAMOLETNAYA GAMMA--S'YEMKA ZAPASOV VLAGI V SLOYE POVERKHNOSTNOGO ZADERZHANIYA),
Institut Prikladnoi Geofiziki, Moscow (USSR).
A. V. Dmitriyev, R. M. Kogan, and Sh. D. Fridman.
Meteorologiya i Gidrologiya, No 4, p 64-76, April 1973. 3 tab, 19 ref.

Descriptors: *Soil moisture, *Moisture content, *Storage, *Remote sensing, *Gamma rays, Surveys, Aircraft, Radiation, Radioactivity, Radioisotopes, Snowmelt, Precipitation (Atmospheric), Equations.
Identifiers: *USSR (Shelon' River basin).

Estimates of surface detention storage in the Shelon' River basin were based on an airborne gamma survey performed on May 5-19, 1965, over test strips designed for studying accuracy of snow-water equivalent measurement using airborne gamma techniques. Measurements were made over 5 test strips which differed in land use, soil type, and character of relief. To obtain a recording of the gamma field, flights were made over all strips in the fall of 1965 (October 8-11). Water storage on the surface in May 1965 was considerably greater than in October. On four strips the moisture excess was about 10 mm and on one strip it was about 20 mm. No temporary accumulation of water on the surface was observed in May or October. The constancy of magnitude of the gamma field in May and October indicates steady-state moisture conditions in the soil and on the surface during each of these periods. (Josefson-USGS)
W74-02307

SATURATED-UNSATURATED SEEPAGE BY FINITE ELEMENTS,
Volcani Inst. of Agricultural Research, Bet-Dagan (Israel). Dept. of Soil and Water.
S. P. Neuman.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10201, p 2233-2250, December 1973. 9 fig, 19 ref, 3 append.

Descriptors: *Seepage, *Saturated flow, *Unsaturated flow, *Finite element analysis, Soil water movement, Groundwater movement, Simulation analysis, Porous media.

A Galerkin-type finite element method is given to solve the quasilinear partial differential equations of transient seepage in saturated-unsaturated porous media. The resulting computer program is capable of handling nonuniform flow regions having complex boundaries and arbitrary degrees of local anisotropy. Flow can take place in a vertical plane, in a horizontal plane, or in a three-dimensional system with radial symmetry. An arbitrary number of seepage faces can be considered simultaneously, and the positions of the exit points on these boundaries are adjusted automatically during each time step. Two examples, one of seepage through an earth dam with a sloping core and horizontal drainage blanket, and the other of seepage through a layered medium cut by a complex topography, are included. These examples indicate that the classical concept of a free surface is not always applicable when dealing with transient seepage through soils. (Knapp-USGS)
W74-02313

CONTRIBUTION OF DEVELOPED AND NATURAL MARSHLAND SOILS TO SURFACE AND SUBSURFACE WATER QUALITY,
Wisconsin Univ., Madison. Dept. of Soil Science.
For primary bibliographic entry see Field 05B.
W74-02327

GENERAL SOILS STUDY: PEARL RIVER, HANCOCK, HARRISON COUNTIES, MISSISSIPPI.
Soil Conservation Service, Gulfport, Miss.

Prepared for The Gulf Regional Planning Commission, Gulfport, Mississippi, 1972. 132 p, 2 fig, 23 tab.

Descriptors: *Gulf coastal plain, *Comprehensive planning, *Data collections, *Soil surveys, Soil types, Mapping, Soil physical properties, *Mississippi, Soil properties, Soil classification, Soil analysis.

The Gulf Regional Planning Commission, which serves the southeastern part of Mississippi, studied the soil types in its jurisdiction and the suitability of each soil for various uses. Twenty-three different types of soil are described, and these form 22 different soil associations. Each soil type is analyzed under the following characteristics: (1) soil properties, including water table depth, percolation rate, depth to hard rock, flood hazard, and thickness and texture of soil horizons; (2) stability of the soil for various engineering uses; (3) limitations for some urban uses; (4) suitability for cropland, pasture and woodland; (5) suitability for horticultural plants; and (6) limitations for recreational use. Maps of the distribution of each soil type are also included. (Poertner)
W74-02333

EVALUATION OF SOIL MOISTURE REGIME IN A WATERSHED,
New Brunswick Univ., Fredericton.
K. S. Davar, and D. J. Calkins.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 20 p, 3 fig, 3 tab, 2 ref.

Descriptors: *Soil moisture, *Soil moisture meters, Soil water, Moisture content, Nuclear moisture meters, Subsurface waters, Networks, Data collections, Hydrologic data, Stations, Statistics, Streamflow, *Canada, Watershed management.

The type of hydrologic response that occurs at any time in a watershed depends largely on the actual prevailing soil moisture regime. The determination of soil moisture content has been facilitated by the commercial availability of the neutron-scattering depth probe. A methodology is presented for the evaluation of watershed soil moisture regimes. Although demonstrated on a region in New Brunswick, Canada, it can be an especially important factor in areas with generally low soil moisture, where small changes in such moisture reflect a significant change in the response system. It was observed that data at each station were from different populations, and that strong correlations existed between most of the stations in representing soil moisture regime changes in relation to streamflow. (Muller-Arizona)
W74-02355

CHLORODIOXINS IN PESTICIDES, SOILS, AND PLANTS,
Agricultural Research Service, Beltsville, Md. Agricultural Environmental Quality Inst.
For primary bibliographic entry see Field 05B.
W74-02371

PRESCRIBED FIRE EFFECTS ON WATER REPELLENCY, INFILTRATION AND RETENTION IN MIXED-CONIFER LITTER, DUFF AND SOIL,
California Univ., Berkeley. School of Forestry and Conservation.
For primary bibliographic entry see Field 4C.
W74-02442

ON SOLVING THE UNSATURATED FLOW EQUATION: THE FLUX-CONCENTRATION RELATION,
Commonwealth Scientific and Industrial Research Organization, Canberra (Australia).
J. R. Philip.
Soil Science, Vol 116, No 5, p 328-335, November 1973. 3 fig, 24 ref.

Descriptors: *Unsaturated flow, *Soil water movement, *Equations, Mathematical studies, *Soil moisture, Infiltration, Sorption.
Identifiers: Flux concentration.

The flux concentration relation expresses in reduced form the dependence of flux density on moisture content during various unsteady flow phenomena in unsaturated soils. The general properties of the flux concentration were established for various phenomena: one-dimensional sorption and infiltration with constant concentration conditions and one-dimensional sorption (for the linear soil only) with constant and variable flux and variable concentration conditions. The flux concentration is independent of time for some phenomena and it varies only mildly with time for some others; and, for some phenomena, the dependence of flux concentration on the shape of the moisture diffusivity function lies within fairly narrow bounds, which are fixed by reference to the extreme cases of the delta-function and the linear soil. This relative stability makes it a useful aid to the study of methods of solving the unsaturated flow equation. An appendix demonstrates that the approximation of step function moisture profiles implies a delta function moisture diffusivity function. (Knapp-USGS)
W74-02464

ON THE CONCEPT AND DETERMINATION OF CRITICAL SOIL MOISTURE,
M. Gracanin.
Acta Bot Croat. 31. p 181-188, 1972.
Identifiers: *Soil moisture, *Reviews, *Wilting point, Inert water.

A review of literature on the determination of permanent wilting coefficient or wilting point is given. Inert water (Iv) values determined in the laboratory were highly dependent on the amount of rooting throughout the soil. Lower Iv values were generally obtained from soils with more roots. This limitation occurs especially in heavy colloid-rich soil with slow movement of capillary water. In determination of critical water content in the field these factors are more strongly expressed. The following are differentiated: 'the soil capacity for inert water' or the real critical moisture determined by the moisture at which the absorptive powers of soil and the plant are in equilibrium; 'critical field moisture' (Vkp)/or the moisture of the rhizosphere at which plants cannot supply themselves in time with ecologically active water due to slow movement of capillary water; and 'apparent critical field moisture' (Avkp) determined by the disproportion of transportation rate in the conducting vessels of the plant and of transpiration intensity. Although Iv is relatively constant,

Vkp is dependent on soil texture and structure, root net architecture, and longitudinal growth of the root, plant species and developmental phase. Avkp is relatively independent of soil moisture, but depends on the capacity of the plant to regulate water transportation and transpiration rates.--Copyright 1973, Biological Abstracts, Inc.
W74-02546

INFLUENCE OF HERBICIDES ON MICROBIOLOGICAL CONDITIONS,
Komenskeho Universita, Bratislava (Czechoslovakia). Dept. of Microbiology.
For primary bibliographic entry see Field 05B.
W74-02548

A STUDY OF ITEMS IN THE GROUNDWATER BALANCE OF WATERLOGGED AREAS (OB UZUCHENII ELEMENTOV BALANSA GRUNTOVYKH VOD NO ZABOLOCHENNYKH UCHASTKAKH),
For primary bibliographic entry see Field 02D.
W74-02610

WATER RESOURCES OF THE SKOKOMISH INDIAN RESERVATION, WASHINGTON,
Geological Survey, Tacoma, Wash.
D. Molenaar, and J. E. Cummans.
Open-file report, 1973. 58 p, 6 fig, 15 tab, 10 ref, append.

Descriptors: *Water resources, *Surface waters, *Groundwater resources, *Indian reservations, *Washington, Hydrologic data, Streamflow, Flow rates, Water wells, Aquifer characteristics, Water yield, Water quality, Tidal effects, Saline water intrusion, Estuaries, Well data, Drillers logs, Water level fluctuations, Water temperature, Flood plains, Water analysis, Chemical analysis, Data collections, Floods.
Identifiers: *Skokomish Indian Reservation (Wash).

The 7.5-square-mile Skokomish Indian Reservation in central Mason County, Washington, has an abundant supply of good quality surface water from the Skokomish River for use in a potential fish hatchery or other aquaculture facility. The average flow of the river at the reservation for the period 1944-71 was about 540,000 gpm; the greatest flow was about 12.1 million gpm and the smallest flow was about 56,100 gpm. Saline water from Hood Canal moves upstream less than a mile in the tidal reach of the Skokomish River. The flood of January 20-21, 1972, with a flow of about 8.3 million gpm, covered a large part of the flood plain, where many homes are situated; a flood of this size occurs, on the average, every 4 years. Several small streams flow eastward across the reservation into Hood Canal. Some of these streams dry up in the summer but others flow the year round. Water from wells is obtained mostly at depths less than 70 feet. Wells generally are used for domestic supplies, and pump yields are 5-10 gpm. Seasonal fluctuations of water levels in wells range from less than a foot to about 4 feet. The water is of good chemical quality. (Woodard-USGS)
W74-02623

2H. Lakes

SOME LIMNOLOGICAL REMARKS ON LAKE SAIZUCHI-NUMA, YAMAGATA PREFECTURE, (IN JAPANESE),
Yamagata Univ. (Japan). Lab. of Science Education.
For primary bibliographic entry see Field 05C.
W74-02207

COMPUTER SIMULATION OF TROPHIC LEVEL INTERRELATIONSHIPS IN CAYUGA LAKE,
Cornell Univ., Ithaca, N.Y.
For primary bibliographic entry see Field 05C.
W74-02216

EXPERIMENTAL STUDIES ON PHYTOPLANKTON SUCCESSION IN CAYUGA LAKE,
Cornell Univ., Ithaca, N.Y.
For primary bibliographic entry see Field 05C.
W74-02217

USING THE ADSORPTION METHOD ON ACTIVATED CHARCOAL WITH CHLOROFORM EXTRACTION (CCE) FOR EVALUATING WATER POLLUTION BY ORGANIC SUBSTANCES, (IN RUSSIAN),
Permskii Politekhnicheskii Institut (USSR). Dept. of Sanitary Technology.
For primary bibliographic entry see Field 05B.
W74-02232

ON THE VARIATION OF SALINITY DISTRIBUTION IN A RESERVOIR, SITUATED IN RECLAIMED LAND, (JAPANESE),
Saga Univ. (Japan). Lab. of Shore Reclamation.
K. Watanabe, and K. Hasegawa.
Agric Bull Saga Univ. 32. p 97-106. 1972. Illus. (English summary).
Identifiers: Irrigation water, *Reclaimed land, Reservoirs, *Salinity distribution, Wind.

In a reservoir, situated in reclaimed land, it takes about a year after construction for salinity to decrease within the limit of allowable irrigation water, and then salinity occurs periodically. A long-term observation was carried out in order to determine the mechanism of variation of salinity in a reservoir. The freshening process is divided into a period of replacement of sea water by fresh water and a period of variation of salinity. A large-scale reservoir has a strong tendency for 2-layer stratified flow with dense salt water at the bottom. A small-scale reservoir has good vertical diffusion because of the small difference of density between the 2 layers. In the period of the variation of salinity the salt inflow by ground water must be considered. Wind strongly affects the vertical distribution of salinity, and the critical velocity of wind is related to the depth of fresh water in a reservoir. A reservoir should be located in the lowest reaches of reclaimed land, some distance away from a sea dike in order to check the intrusion of sea water.--Copyright 1973, Biological Abstracts, Inc.
W74-02246

THE ABILITY OF BACTERIA TO MINERALIZE ALGAE ORGANIC MATTER, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Institut Biologii Vnutrennykh Vod.
For primary bibliographic entry see Field 05B.
W74-02252

MICROFLORA AND CHEMICAL COMPOSITION OF THE BOTTOM DEPOSITS OF THE KAIRAK-KUM RESERVOIR, (IN RUSSIAN),
Akademiya Nauk Tadzhikskoi SSSR, Dushanbe. Institut Zoologii i Parazitologii.
For primary bibliographic entry see Field 05B.
W74-02253

LAKE SARY-CHELEK AND ITS ZOOPLANKTON, (IN RUSSIAN),
Tashkent Univ. (USSR).
M. F. Bundtsettel'.
Uzb Biol Zh. Vol 16, No 1, p 51-53. 1972.
Identifiers: *Asplanchna-Priodonta, Lakes, Plankton, *USSR (Taskent), *Zooplankton.

Following a description of certain physical characteristics of this USSR lake the zooplankton population is described, which is predominantly composed of Asplanchna priodonta. The highest number was observed during summer. The effect of various temperatures at various depths of the lake, and its effect on the zooplankton are presented.--Copyright 1973, Biological Abstracts, Inc.
W74-02261

ADJUSTMENT OF FRICTION IN HYDRAULIC MODELS OF LAKES,
Worcester Polytechnic Inst., Mass. Alden Research Labs.
J-C. Shiau, and R. R. Rumer, Jr.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10222, p 2251-2262, December 1973. 2 fig, 1 tab, 12 ref, 3 append. FWPCA (EPA) Grant WP-00837.

Descriptors: *Seiches, *Hydraulic models, *Hydraulic similitude, *Waves (Water), Fluid friction, Froude number.
Identifiers: Proudman number.

For complete dynamic similarity between a hydraulic model of a lake or closed basin and its prototype, both the Froude number and the Proudman number must be equal in the model and the prototype. For turbulent flow the Proudman number cannot be explicitly determined and adjustment of model friction may be required. A method for adjustment of model friction is described which requires comparison of the damping of a standing long wave (or seiche) in the prototype and in the model basin. Assuming that the model frictional resistance could be decomposed into smooth boundary resistance and the resistance due to the addition of roughness elements, a mathematical formulation was developed for use in predicting the decay modulus for a roughened model basin. Good agreement was found between the analytical predictions and experimental results. (Knapp-USGS)
W74-02314

CONTRIBUTION TO THE STUDY OF ZOOPLANKTON AND ZOOBENTHOS IN THE MINGECHAUR RESERVOIR, (IN RUSSIAN),
A. R. Khalilov, and I. A. Akhmedov.
Izv Akad Nauk Az SSR Ser Biol Nauk. 2. p 91-96. 1972.
Identifiers: Arctodiaptomus-Acutilobatus, *Cryptochironomus, Daphnia-Longispina, Diaphanosoma-Brachyurum, Mesocyclops-Dybowskii, Plankton, Polyarthra-Trigla, *Procladius, Reservoirs, Synchaeta-Pectinata, *USSR (Azerbaydzhan), *Zooplankton, Zoobenthos.

The zooplankton and zoobenthos fauna of the Mingechaur (Azerbaydzhan, USSR) storage-lake was studied. The zooplankton fauna contained 25 species of which Polyarthra trigla, Synchaeta pectinata, Diaphanosoma brachyurum, Daphnia longispina, Arctodiaptomus acutilobatus and Mesocyclops dybowskii were prevalent. The zoobenthos fauna contained 77 species and forms with Procladius and Cryptochironomus ex. gr. defectus being most frequent.--Copyright 1973, Biological Abstracts, Inc.
W74-02341

USE OF SEPHADEX GEL FOR THE FRACTIONATION OF ORGANIC MATTER IN LAKE WATER, (IN RUSSIAN),
Akademiya Nauk Estonskoi SSR, Tartu. Inst. of Zoology and Botany.
For primary bibliographic entry see Field 05A.
W74-02343

COMPARATIVE BIOLOGY OF TILAPIA RENDALLI (BOULENGER) (PISCES CICHLIDAE) IN LAKE ITASY AND LAKE MANTASOA, (IN FRENCH),
J. Moreau.
Cah O R S T O M (Off Rech Sci Tech Outre-Mer) Ser Hydrobiol. Vol 5, No 1, p 3-52. Illus. 1971. (English summary).
Identifiers: Breeding, *Cichlidae, Comparative biology, Fecundity, Feeding, Growth, Lakes, *Madagascar (Lake Itasy-Lake Mantosa), Malagasy, Pisces, Population, Tilapia-Nilotica, *Tilapia-Rendalli.

A comparative study was made of the biology of T. rendalli in 2 lakes of the Malagasy Highlands (Madagascar): Itasy and Mantasoa lakes. These lakes were compared with respect to the geography, climate, aquatic conditions and T. rendalli populations. T. rendalli has a larger breeding season and better fecundity in Itasy lake. In Mantasoa lake the fecundity depends on the breeding season. Egg laying occurs more often in the former than in the latter lake. This fish is herbivorous and phytoplanktophagous in Itasy lake and only planktophagous in Mantasoa lake. Statistical tests on its condition-coefficient are included. The growth of T. rendalli was analyzed by reading and interpreting ring formation on the scales. Growth curves are drawn according to the equation of Von Bertalanffy by Abramson and Tomlinson method. T. renalli population dynamics and the suitability of introduction of a new species of Tilapia (T. nilotica) is discussed.--Copyright 1973, Biological Abstracts, Inc.
W74-02344

LIMNOLOGICAL CHARACTERISTICS OF JEZERO ON THE ISLAND OF KRK, (IN SERBO-CROATIAN),
M. Petrik, M. Zebec, and M. Mestrov.
Krs Jugosl Carsus Jugosl. Vol 7, No 6, p 189-206. 1971. Illus. (English summary).
Identifiers: Islands, Krk Island, Limnological studies, *Yugoslavia (Jezero Lake).

Physico-chemical and biological analyses of the water of Jezero, a lake on the island of Krk, Yugoslavia carried out in June and July 1968, have shown that horizontally the water is thermally and chemically homogeneous and that thermal and chemical stratification takes place in the first half of summer. According to biological evaluation and vertical distribution of O2, showing a considerable domination of the deficient over the sufficient layer, Jezero is a typical eutrophic lake; it is in an advanced stage of its development as is shown by the distribution of macrovegetation in the lake. Low concentrations of BOD5, nitrogen compounds, and phosphates indicate that there is no pollution of water. Saprobiologically, the water has proved to be in a beta-mesosaprobic condition. The hardness of the water, 230-279 mg CaCO3/l, is for the most part carbonate hardness, largely consisting of Ca hardness, which is characteristic of water from calcareous soil. Chlorides were not high, about 90 mg/l; this concentration is far below the concentration found in the well water Vrutak which provides water for the water-supply system of the near-by village of Njivice. Measures are proposed to stop the process of eutrophication and pollution from the surrounding parts of the lake and from the Veli Lug area.--Copyright 1973, Biological Abstracts, Inc.
W74-02386

GROWTH RATES OF LEPOMIS MACROCHIRUS (CENTRARCHIDAE) IN THREE AREAS OF LAKE TEXOMA,
Ouachita Baptist Univ., Arkadelphia, Ark.
H. Brown, and H. McCarley.
Southwest Nat. Vol 17, No 4, P 371-374. 1973. Illus.
Identifiers: Centrarchidae, *Growth rates, Lakes, Lepomis-Macrochirus, *Lake Texoma (Tex-Okla), *Bluegulls.

Growth rates of bluegills (L. macrochirus) were determined for 3 areas of Lake Texoma Oklahoma: the Buncombe Creek area, the Island area, and the Denison Dam area. The total length of the Island bluegills for all age classes exceeded bluegills from both the Buncombe Creek and Denison Dam areas. The difference in total length of bluegills of the IV and V age classes from the Islands was significantly greater than the bluegills from the other 2 areas. Calculated growth rates of age groups IV and V also confirmed that bluegills in the Island area grew more during each year of life than bluegills in the other 2 areas.--Copyright 1973, Biological Abstracts, Inc.
W74-02422

MERCURY IN FISH, SEDIMENTS, AND WATER IN LAKE OAHE, SOUTH DAKOTA,
Environmental Protection Agency, Kansas City, Mo. Region VII.
For primary bibliographic entry see Field 05A.
W74-02423

TOXAPHENE ACCUMULATION IN FISH IN LAKES TREATED FOR ROUGH FISH CONTROL,
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 05C.
W74-02425

THE INFLUENCE OF ORGANIC DECOMPOSITION ON CARBON DIOXIDE HYDROGEN SULFIDE, DISSOLVED OXYGEN, AND ALGAE GROWTH IN THE DWORSHAK RESERVOIR,
Idaho Univ., Moscow. Dept. of Bacteriology and Biochemistry.
For primary bibliographic entry see Field 05C.
W74-02444

DETERMINATION OF THE MICROLEVEL TEMPERATURES DURING LAKE COOLING, ICE FORMATION, ICEMELT AND THE BREAK-UP OF THE ICE COVER OF A MOUNTAIN LAKE, HOLLAND LAKE, MISSOULA COUNTY,
Missoula. Dept. of Zoology.
For primary bibliographic entry see Field 02C.
W74-02447

DESCRIPTION, DISTRIBUTION, AND ECOLOGY OF THE ROTIFER AND CRUSTACEAN PLANKTON COMMUNITIES, FLATHEAD LAKE, MONTANA,
Montana Univ., Missoula. Dept. of Zoology.
J. F. Tibbs.
Available from the National Technical Information Service as PB-226 242 $2.75 in paper copy, $1.45 in microfiche. Montana University Joint Water Resources Research Center, Report No. 39 Bozeman, (1973) 9p, 1fig, 1tab, 13 ref. OWRR A-052-MONT (1).

Descriptors: Ecology, Zoology, *Crustaceans, *Rotifers, *Plankton, Montana, Distribution.
Identifiers: *Flathead Lake (Mont).

Objectives were to determine the rotifer, copepod, and cladoceran fauna of Flathead Lake and to describe the Diel and temporal variations of density and spatial distribution as influenced by physical and chemical features of the lake. Another objective was the recovery of records, notes, and collections of previous investigators, such that irregularities in the published literature might be corrected or confirmed. Because few collections of any sort remain in Biological Station or University of Montana Museums, to locate museums, universities, and individuals who may have or may know the location of Flathead Lake zooplankton collections. (Holje-Montana)
W74-02448

QUANTITATIVE ESTIMATION OF BOTTOM FAUNA IN LAKE MARIUT,
Alexandria Inst. of Oceanography and Fisheries (Egypt).
A. A. Samaan, and A. A. Aleem.
Bull Inst Oceanogr Fish. 2. p 375-397, 1972, Illus.
Identifiers: Balanus-improvisus, *Bottom fauna, Chironomid, Corophium, Cyprideis-litoralis, Foraminifera, Gammarus, Lakes, Larvae, Melania-tuberculata, Mercierella-enigmatica, Nematode, Nereis-diversicolor, Oligochaete, *United Arab Republic (Lake Mariut), *Distribution patterns.

The distribution of bottom animals in Lake Mariut, United Arab Republic varies greatly according to the different habitats. The highly polluted area is extremely poor in bottom animals, while the less polluted area harbors a fauna similar to that present in the bare area but in smaller numbers. The bare area is the most suitable habitat for the survival of benthos. The Potamogeton belt was unfavorable for the growth of bottom animals. The polychaete Nereis diversicolor is the most important bottom animal inhabiting the lake and it constitutes about 49.9% of the biomass of bottom animals. It shows a peak in Jan. and in April. The gastropod Melania tuberculata constitutes about 34.3% of the biomass of the bottom fauna. It is widely distributed in the bare area. Melania is recorded all year with maximum distribution in Aug. and Sept. The amphipod Corophium constitutes about 11.2% of the biomass of bottom animals. It is recorded only in the bare area. Gammarus comprises about 3.4% of the biomass of the bottom animals in the lake. Chironomid larvae constitute about 1.2% of the biomass of bottom animals in the lake. They form the mean benthos at the Potamogeton plant belt. Two other forms of bottom animals of rare occurrence comprise the barnacle Balanus improvisus and the tube worm Mercierella enigmatica. These animals show uneven distribution and they usually grow on hard bottoms and on stems of phragmites. Microscopic examination of the bottom muds indicates the presence of several microorganisms in the lake bottom. These include: the ostracod Cyprideis litoralis, free living nematodes, oligochaetes and foramini era.--Copyright 1973, Biological Abstracts, Inc.
W74-02549

ON MALLOMONAS LELYMEME HARRIS ET BRADLEY (CHRYSOPHYCEAE), (IN JAPANESE),
Kobe Univ. (Japan). Dept. of Biology.
E. Takahashi, and H. Hirose.
Bull Jap Soc Phycol. 20 (3): 90-93, 1972, Illus, English summary.
Identifiers: *Chrysophyceae, *Japan, Mallomonas-lelymeme, Morphology, Ponds, Temperature, Hydrogen ion concentration, Algae.

M. lelymeme was found from ponds in Japan. The characteristic structure revealed by electron microscopy closely agrees with that of the type species, but differs slightly from other foreign material hitherto reported, in that the lattice structure at the shield was smaller in number of the crossing ridges. In Japan and foreign countries, the species was found from lakes and ponds whose pH was in a range from 4.9-6.6 and the water temperature was in a wide range less than 29C. This proves that the species is acidophylic and eurythermal.--Copyright 1973, Biological Abstracts, Inc.
W74-02550

COMPARATIVE PRODUCTIVITY STUDIES OF THREE MECKLENBURG LAKES (LAKE KUMMEROW, LAKE TETEROW AND LAKE MALCHIN), (IN GERMAN),
Rostock Univ. (East Germany). Institut fuer Hygiene.
L. Kalbe, and H. A. Schulze.
Z Gesamte Hyg Grenzgeb. Vol 18, No 3, p 197-201. 1972. Illus.

Identifiers: *East Germany (Mecklenburg), Lakes, *Sampling, *Photosynthetic productivity, Plankton.

These 3 lakes, Kummerower (KS), Teterower (TS), and Malchiner (MS) See (East Germany) were studied by spot sampling and by the 14C-method in situ for photosynthetic productivity. Various characteristics of these lakes, such as geology, size, depth, etc. are pointed out. The tests were done by a crossover technique, involving exposure of sample bottles from one lake to one of the other lakes. Plankton containing MS and TS water are superior to KS water in regard to photosynthetic potency and nutrient reserves, but cannot fully utilize these potencies in the original waters for reasons of the optical energy climate.--Copyright 1973, Biological Abstracts, Inc.
W74-02558

PHYTOINDICATION OF SALINE GROUND IN DRYING UP SHALLOW LAKES, (IN RUSSIAN),
M. T. Ilyushina.
Ekologiya. Vol 3, No 5, p 68-73. 1972.
Identifiers: Lakes, *Phytoindicators, Phytocenoses, Shallow lakes, *USSR (West Siberia), *Salinity.

Indicators of the degree of salinity increase in grounds of drying-up lakes of West Karakhsta and southern West Siberia, USSR, from an ecological series of phytocenoses of the near lake area (prior to drying-up) and of phytocenoses of the lake bottom (after drying-up) are presented.--Copyright 1973, Biological Abstracts, Inc.
W74-02559

SEASONAL VARIATIONS IN THE QUALITATIVE AND QUANTITATIVE COMPOSITION OF YOUNG FISH POPULATIONS IN THE VARVARA RESERVOIR, (IN RUSSIAN),
G. S. Abbasov, and Kh. M. Ali-zade.
Izv Akad Nauk Az SSR Ser Biol Nauk. 1, p 91-96. 1972. Illus.
Identifiers: Barbel, Bream, Bullhead, *Fish populations, Gambusia, Gudgeon, Perch, Pike, Reservoirs, Roach, Seasonal, Tench, *USSR (Varuara reservoir).

The ichthyofauna of the Varvara storage lake, USSR, was studied with special regard to young fishes. The young fish population was most numerous spring and summer, and most scarce during fall and especially in winter. Roach, bream and Gambusia were the most populous of a total of 26 species, while small populations of tench, barbel, pike perch, gudgeon and bullhead were found.--Copyright 1973, Biological Abstracts, Inc.
W74-02560

ENVIRONMENTAL STUDY OF ERTS-1 IMAGERY: LAKE CHAMPLAIN AND VERMONT,
Vermont Univ., Burlington.
For primary bibliographic entry see Field 07B.
W74-02581

STUDIES IN THE LAKE ONTARIO BASIN USING ERTS-1 AND HIGH ALTITUDE DATA,
Guelph Univ. (Ontario).
For primary bibliographic entry see Field 07B.
W74-02599

PROGRESS OF AN ERTS-1 PROGRAM FOR LAKE ONTARIO AND ITS BASIN,
Environmental Research Inst. of Michigan, Ann Arbor.
For primary bibliographic entry see Field 07B.
W74-02600

REMOTE SENSING OF TURBIDITY PLUMES IN LAKE ONTARIO,
Geological Survey, Arlington, Va.
For primary bibliographic entry see Field 07B.
W74-02601

ERTS-1 VIEWS THE GREAT LAKES,
Wisconsin Univ., Milwaukee. Air Pollution Analysis Lab.
For primary bibliographic entry see Field 07B.
W74-02602

THE AGE GROUP DISTRIBUTION OF PELOBATES FUSCUS (LAUR.) AT THE KUIBYSHEV RESERVOIR SHORES (IN RUSSIAN),
Kazan State Univ. (USSR).
V. A. Ushakov, and V. I. Garanin.
Ekologiya, Vol 3, No 4, p 89-90, 1972.
Identifiers: Age distribution, *Pelobates-fuscus, Reservoir shores, *USSR (Kuibyshev reservoir), *Animal populations.

The influence of huge water reserves (USSR) upon the structure of animal populations surrounding it was examined. A P. fuscus population was studied from 1964-1969. Different age groups settle at various sites. Adults and young disperse during the summer throughout forests along the accumulative beaches, while the forests lining abrasive beaches are almost exclusively occupied by young animals that do not participate in that seasons mating period. Through such emmigration of young, the area covered by P. fuscus increases while the competition in the optimal area diminishes.--Copyright 1973, Biological Abstracts, Inc.
W74-02641

STUDIES OF THE SINKING PLUME PHENOMENON,
Argonne National Lab., Ill. Center for Environmental Studies.
For primary bibliographic entry see Field 05C.
W74-02644

SEDIMENTATION AND SCOUR OFF NUCLEAR POWER PLANTS,
Wisconsin Univ., Madison. Marine Research Lab.
For primary bibliographic entry see Field 02J.
W74-02645

AGE STRUCTURE OF POPULATIONS OF SOME AMPHIBIA ON BANKS OF WATER RESERVOIRS (IN CZECH),
V. A. Usakov.
Biologia (Bratisl), Vol 27, No 11, p 891-895, 1972, Illus, English summary.
Identifiers: Age structure, *Amphibia, *Bombina-bombina, *Pelobates-fuscus, Reservoirs, Animal populations.

As the result of an analysis of the age structure of populations of Pelobates fescus Laur. and Bombina bombina L. it is concluded that a large water reservoir influences local peculiarities of territorial distribution of particular age groups of Amphibia. The different relationships of the particular groups within the abrasional and accumulative river side populations are predetermined.--Copyright 1973, Biological Abstracts, Inc.
W74-02650

2I. Water in Plants

STUDY OF THE INTRACELLULAR WATER STATE IN PLANTS UNDER THE EFFECT OF PHENOLS, (IN RUSSIAN),
Voronezhskii Lesotekhnicheskii Institut (USSR).
V. D. Roshchina.
S-KH Biol. Vol 7, No 4, p 554-558. 1972. Illus. (English summary).
Identifiers: *Beta-Vulgaris-F-Rubra, *Intracellular water, *Phenols, *Plant tissues, Water exchange (Plants).

The storing tissue of Beta vulgaris f. rubra was treated with solutions of phenol, resorcine, floroglucine, pyrogallol, salicylic and cinnamic acids at concentrations of 10-3 to 10-4 M. Changes of the water content were determined by the method of dynamic characteristics. Phenol compounds affect the water exchange of plant tissues and the state of the intracellular water, probably due to the interaction of phenols with cytoplasmic proteins. The greatest transformations of the water composition are observed as an effect of aromatic oxyacids and polyphenols with the orthoplacement of hydroxylic groups.--Copyright 1973, Biological Abstracts, Inc.
W74-02234

CILIATED PROTOZOA. AN ILLUSTRATED GUIDE TO THE SPECIES USED AS BIOLOGICAL INDICATORS IN FRESHWATER BIOLOGY,
H. Bick.
World Health Organization: Geneva, Switzerland. 1972. 198 p. Illus. Pr. $6.00.
Identifiers: Biology, Books, *Ciliated protozoa, *Guides (Illustrated), *Indicators (Biological), Protozoa, Species.

This illustrated guide contains a taxonomic key to the most important families and genera of non-parasitic freshwater ciliates, detailed descriptions of the morphology and ecological requirements of 84 spp., and diagnostic line illustrations of 135 spp. A short introduction outlines some of the methods used in taxonomy, mentioning key points that should be noted when a species is being determined. The guide also includes a selected bibliography, a glossary to technical terms and an index of genera and species described or illustrated.--Copyright 1973, Biological Abstracts, Inc.
W74-02236

THE PHENOLOGY OF DRAGONFLIES IN THE DEHRA DUN VALLEY, INDIA,
Forest Research Inst., Dehra Dun (India). Forest Entomology Branch.
A. Kumar.
Odonatologica (Utr). Vol 1, No 4, p 199-207. 1972. Illus.
Identifiers: *Dragonflies, *India (Dehra Dun Valley), Larval habitats, *Phenology, Monsoon ponds.

Seasonal distribution of some Indian species, which centers largely around different types of larval habitats, is discussed. In the valley, 2 main types of larval habitats are present, i.e., the perennial streams, and seasonal monsoon ponds. The observations seem to indicate that in the species developing in perennial streams, the larval period is prolonged for some 5-8 mo., while the adults are on wings for not less than 3-4 mo. On the other hand, the larval period of species breeding in seasonal monsoon ponds is shortened to about 2-4 mo., while their adult life span is prolonged to 8-9 mo.--Copyright 1973, Biological Abstracts, Inc.
W74-02237

ON THE ORIGIN OF THE WET-SEASON FORM OF ZONOCERUS VARIEGATUS (L.) (ORTH., ACRIDIDAE) IN SOUTHERN NIGERIA, WITH SOME BIOLOGICAL NOTES,
Iban Univ. (Nigeria). Dept. of Biology.
T. Taylor.
Bull Entomol Res. Vol 61, No 4, p 661-667. 1972. Illus.
Identifiers: Ctenophores, *Acrididae, Biological studies, Breeding, Forests, Habitats, Morphometrics, *Nigeria, Orthoptera, Rain, Savanna, Seasons, *Zonocerus-Variegatus.

Previous reports and field observations at Ibadan and in northern Nigeria established the occurrence of a dry-season form and wet-season form of Z. variegatus. The wet-season form in the savanna areas of northern Nigeria is virtually identical with

that from southern Nigeria on the basis of breeding seasons, habitat and morphometrics. Morphometrics show the wet- and dry-season forms to be distinct. The dry-season form in the wet rain forest zone may spread into the dry savanna areas giving rise to a wet-season form adapted to the different climatic conditions. The increasing occurrence of the wet-season form in the south probably represents a re-invasion by the northern wet-season form.--Copyright 1973, Biological Abstracts, Inc.
W74-02238

PLANT ASSOCIATIONS OF THE SOUTHERN VERCORS MASSIVE: ASSOCIATIONS OF SPRINGS AND MARSHLANDS AT SUBALPINE ELEVATION,
J. Ritter.
Vegetatio. Vol 25, No 5/6, p 357-365. 1972. Illus.
Identifiers: Elevation, *France (Vercors massive), Habitat, *Marshlands, *Nutrition, *Plant communities, Springs, Subalpine.

The sociological organization and floristic composition of the spring associations Montio-Cardaminetea Montio-Cardaminetalia and Cratoneurion commutati, and of the marshland associations Scheuchzerio-Caricetea fuscae, Caricetalia Davallianae, Eriophorion latifoliae at Vercors massive (France) are described. While the rocky terrain and the alkaline nature of the marshes is determinant for these associations, the presence of streams provides for their nutrition and is thus likewise indispensable.--Copyright 1973, Biological Abstracts, Inc.
W74-02243

THE ACTION OF ABSCISIC ACID ON ION UPTAKE AND WATER FLOW IN PLANT ROOTS,
Sydney Univ. (Australia). School of Biological Sciences.
For primary bibliographic entry see Field 03F.
W74-02260

DESIGN, OPERATION, AND TEMPERATURE SENSITIVITY OF A THERMOCOUPLE PSYCHROMETER MOISTURE POTENTIOMETER BASED ON THE PELTIER EFFECT, (KONSTRUKTSIYA, METODIKA PRIMENENIYA I TEMPERATURNAYA CHUVSTVITEL'NOST' TERMOPARNOGO PSIKHROMETRICHESKOGO VLAGOPOTENTSIOMETRA, OSNOVANNOGO NA EFFEKTE PEL'T'YE),
Agrofizicheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 02G.
W74-02303

ECOLOGICAL AND PHYTOSOCIOLOGICAL STUDY OF A SECTOR IN THE LYBIAN DESERT,
Cairo Univ., Giza (Egypt). Faculty of Science.
K. H. Batanouny, and S. Abu El-Souod.
Vegetatio. Vol 25, No 5/6, p 335-356. 1972. Illus.
Identifiers: Anabasis-Articulata , Aristida-Plumosa, Artemisia-Monosperma, *Deserts, *Ecological studies, Helianthemum-Lippii, *Libian desert, *Phytosociological studies, Pituranthus-Tortousus, Soil moisture.

The area surveyed is located in the north-eastern corner of the Lybian desert and extending along Cairo-Alexandria desert road. The southern part of the area is extremely arid, while the northern part is semi-arid and with graduation in between. The annual rainfall ranges between 24 mm at Giza located in the extreme south and 184 mm at Alexandria located in the north. The vegetation is formed of plant communities with different floristic composition. The plant cover ranges from widely separated patches of vegetation in spots where the coverage is less than 5% to scrubland types where the coverage may reach up to 70%. This difference is comparable to the variation in the annual rainfall from south to north. Five communities were defined along the road, named after the dominant species: Aristida plumosa, Pituranthos tortuosus, Artemisia monosperma, Helianthemum lippii and Anabasis articulata. Each community has a group of perennial species showing abundance-dominance scales and presence values higher than in other communities. Perennials are better indicators for plant life in ary area than ephemerals. Plant communities in the desert are better defined not only by the dominant, but also by the group of ecologically related species, termed 'important species' of the community. Water relations of soil and air are the major controlling factors. The growth of plants is a matter of tolerance and not of fulfillment of requirements. The various species show different ecological amplitudes, connected with the tolerance of the plant to the drastic conditions.--Copyright 1973, Biological Abstracts, Inc.
W74-02507

STUDY ON THE PLASMOLYSIS TIME IN EPIDERMAL CELLS FROM LEAVES OF SAXIFRAGA STOLONIFERA MEERB (IN JAPANESE),
Kumamoto Univ. (Japan). Faculty of Education.
Masa-O. Ya-E.
Mem Fac Educ Kumamoto Univ Sect 1 (Nat Sci). 20. p 33-42, 1972, Illus, English summary.
Identifiers: Diurnal, *Epidermal cells, Leaves, Permeability, *Plasmolysis time, *Saxifraga-stolonifera, Seasonal, Temperature, Time.

The plasmolysis time in epidermal cells from the underside of S. stolonifera was studied especially in relation to temperature. The plasmolyticum was employed 1.5 isotonic and 0.73 M sucrose solution. Plasmolysis time is longest in Jan. and Feb., the coldest season, and is shortest in July and Aug., the hottest season. In spring and autumn, plasmolysis time is intermediate between those in winter and in summer, yet that in spring is longer than that in autumn even at the same temperature. Plasmolysis time in the early morning is longer than that in the daytime, and the more temperature changes in a day, the more plasmolysis time changes. Temperature coefficient of plasmolysis time, speed of rounding up on plasmolysis, was about Q10 ± 4 at 10C-20C-30C, when the temperature during each experiment was changed artificially in Jan. and Feb. In a certain year, the Q10 at 10C-20C in hardened cells was larger than Q10 ± 4. The seasonal and diurnal variations of plasmolysis time are affected passively by temperature.--Copyright 1973, Biological Abstracts, Inc.
W74-02542

SOME FURTHER RESULTS OF THE ZOOPLANKTON STUDIES IN THE CZECHSLOVAK-HUNGARIAN STRETCH OF THE DANUBE,
Slovenske Polnohospodarske Akademie, Bratislava (Czechoslovakia). Laboratorium Rybarstva.
M. Vranovsky.
Biologia (Bratisl), Vol 27, No 11, p 821-827, 1972, Illus, English summary.
Identifiers: *Cladocera, *Copepoda, Czechoslovakia, *Danube River, Hungary, Plankton, *Rotifera, *Zooplankton.

The average abundance of Rotatoria prevailed over that of Copepoda 25 times and over that of Cladocera 170 times in the Danube zooplankton in 1967. The decrease of the current velocity or short-term interruptions of the flow in the backwaters studied showed either none at all or only a small influence on the zooplankton. However, during the autumn interruption of the flow lasting 3 mo. in the backwaters, average abundance of zooplankton increased conspicuously in comparison with that in the main stream.--Copyright 1973, Biological Abstracts, Inc.
W74-02545

A NEW AQUATIC INSECT TRAP,
Union Carbide Corp., Tarrytown, N.Y.
For primary bibliographic entry see Field 07B.
W74-02551

CONSIDERATIONS CONCERNING THE BIOLOGY AND DISTRIBUTION AREA OF THE CYPRINID FISH PSEUDORASBORA PARVA (SCHLEGEL) IN THE ROMANIAN WATERS,
R. Giurca, and N. Angelescu.
Bul Cercet Piscic. Vol 30, No 3/4, p 99-109. 1971. Illus. (English summary).
Identifiers: Biology, *Cyprinid fish, Distribution, Pseudorasbora-Parva, *Romania.

The presence of the genus Pseudorasbora (introduced accidentally from China, with the fry of some game fish species) in natural water bodies (Ilfov, Crisul Repede, Danube Delta, Urlui) and in fish culture stations (Nucet, Pirlita, I. C. Frimu, Cefa, Buftea, Frasinet, Vitanesti, Mostistea) is noted, P. parva (whose vernacular name 'briceag,' was proposed in 1970) is one of the freshwater fishes with a reduced body size (6.5-10.5 cm-without C) and low weight (5.0-19.2 g), sexual maturation taking place simultaneously in individuals of both sexes at the age of 1 yr. It has a high spawning potentiality, represented by a relative fecundity attaining 181%, and an absoulte one, attaining 234%. The gono-somatic ratio is high, reaching at 3 yr the maximum values of 27%. The growth rate is intense at 1 yr. The condition factor represents maximum values (Q ±1.11) at the 3 yr old fishes. Measures are proposed for the elimination of these fish species from the fish culture station, by: the total drainage of the basin, followed by an attentive chlorination and installing afterwards some fine gauzes at the supply channels; the introduction of some predatory fish species, as pike-perch (Stizostedion lucioperca), in the moment when there are no carp fry in the pond, using the same system of gauzes; stocking carp fry only after removing completely the predatory fishes.--Copyright 1973, Biological Abstracts, Inc.
W74-02553

2J. Erosion and Sedimentation

A NEW OSCILLATING WATER TUNNEL,
Queen's Univ., Kingston (Ontario). Coastal Engineering Research Lab.
A. Brebner, and P. H. Riedel.
Journal of Hydraulic Research, Vol 11, No 2, p 107-121, 1973. 4 fig, 2 photo, 11 ref.

Descriptors: *Hydraulic models, *Waves (Water), *Erosion, *Unsteady flow, *Sediment transport, Scour, Sedimentation, Sedimentary structures, Ripple marks, Boundary layers, Turbulent flow.
Identifiers: Oscillating water tunnel.

An oscillating water tunnel with a 12-meter long working section of cross-sectional dimensions 0.5 x 1 meter was designed, built, and tested to simulate wave boundary layers for practically the full range of waves that may be produced in the sea or in wave flumes. The range of orbital amplitudes is 0.1 to 4 meters. The system may be used to determine bed shear stress at fixed beds, to study ripple form on a number of sediments with different specific gravities, and for conducting research into the fundamental properties of oscillatory boundary layers. Another use may be for the study of oscillatory flow around submerged objects such as pipelines or piles. (Knapp-USGS)
W74-02160

THE QUANTITY AND DIMENSIONS OF MICROORGANISMS iN BOTTOM SEDIMENTS OF FISH-BREEDING PONDS (IN RUSSIAN),
Ukrainian Research Inst. of the Fish Industry, Kiev (USSR).
For primary bibliographic entry see Field 08I.
W74-02228

THE RELATIONSHIPS BETWEEN LAND USE AND EROSION IN THE CENTRAL NORTH ISLAND, NEW ZEALAND,
Waikato Univ., Hamilton (New Zealand). Dept. of Earth Sciences.
For primary bibliographic entry see Field 04D.
W74-02287

SLOPE ASPECT AND TUNNEL EROSION IN THE LOESS OF BANKS PENINSULA, NEW ZEALAND,
New South Wales Univ., Kensington (Australia). School of Geography.
P. J. Hughes.
Journal of Hydrology (New Zealand), Vol 11, No 2, p 94-98, 1972. 2 fig, 5 ref.

Descriptors: *Erosion, *Loess, *Gully erosion, Gullies, *Slopes, Topography, Soil erosion.
Identifiers: Soil tunneling, *New Zealand (Banks Peninsula), *Tunnel erosion.

The relationship between slope aspect and tunnel erosion on Banks Peninsula, New Zealand, was measured. For a sample area of Banks Peninsula the ratio of the number of tunneled slopes to the total number of slopes potentially subject to tunneling was determined. This ratio represents the relative likelihood that a slope in a particular aspect class will be affected by tunneling. The results are presented in the form of a rose diagram. Slopes facing west to northwest are most likely, and slopes facing southeast to south-southwest least likely, to be affected by tunneling. (Knapp-USGS)
W74-02288

INVESTIGATION OF FALL VELOCITY OF SEDIMENTS IN MOUNTAIN STREAMS, (ISSLEDOVANIYE GIDRAVLICHESKOY KRUPNOSTI NANOSOV GORNYKH REK),
V. K. Debol'skiy, and L. D. Kogan.
Meteorologiya i Gidrologiya, No 4, p 59-63, April 1973. 3 fig, 1 tab, 6 ref.

Descriptors: *Sedimentology, *Settling velocity, Movement, *Particle shape, *Particle size, Coarse sediments, Sedimentation rates, Standing waters, Equations.

An equation of movement (fall) of a particle in standing water is considered. A general expression is presented for fall velocity of particles of irregular shape. The expression obtained is confirmed by experiments with coarse sediments up to 500 mm in size and by experiments carried out by other investigators. An expression is given for considering particle shape in determining fall velocity. (Josefson-USGS)
W74-02306

HYDROLOGIC EVALUATIONS IN BRIDGE PIER SCOUR DESIGN,
Oregon State Univ., Corvallis. Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W74-02309

BED SCOUR AT END-DUMP CHANNEL CONSTRICTIONS,
Alberta Univ., Edmonton. Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W74-02316

THE IMPORTANCE OF SEDIMENT TRANSPORT IN WATER RESOURCES PLANNING,
Arizona Univ., Tucson.
For primary bibliographic entry see Field 04D.
W74-02351

AN IMPROVED BOTTOM-WATER SAMPLER,
University Coll. of Swansea (Wales). Dept. of Geology and Oceanography.
For primary bibliographic entry see Field 07B.
W74-02410

DIGITAL ANALYSIS OF POTOMAC RIVER BASIN ERTS IMAGERY: SEDIMENTATION LEVELS AT THE POTOMAC-ANACOSTIA CONFLUENCE AND STRIP MINING IN ALLEGHENY COUNTY, MARYLAND,
American Univ., Washington, D.C. Dept. of Biology.
For primary bibliographic entry see Field 07B.
W74-02583

A STUDY ON THE EROSION OF NIIGATA BEACH FROM ERTS-A IMAGERY,
Tokyo Univ. (Japan). Inst. of Industrial Science.
For primary bibliographic entry see Field 07B.
W74-02584

STORM RAINFALL IN THE BLACK SEA REGION AS A FACTOR IN SOIL EROSION,
Ukrainskii Nauchno-Issledovatelskii Gidrometeorologicheskii Institut, Kiev (USSR).
For primary bibliographic entry see Field 02B.
W74-02607

SEDIMENTATION AND SCOUR OFF NUCLEAR POWER PLANTS,
Wisconsin Univ., Madison. Marine Research Lab.
M. L. Kohler, and J. R. Moore.
Available from NTIS as COM-73-10562, $3.00 in paper copy; $1.45 in microfiche. Report No. WIS-SG-73-331, 1972. 21 p, 12 fig, 3 tab.

Descriptors: *Lake Michigan, Lakes, *Nuclear power plants, Sedimentation, Powerplants, *Scour, *Beach erosion, Discharge (Water), Environmental effects, *Wisconsin.
Identifiers: Nearshore processes.

The sedimentary regimes which are interacting in the nearshore zone of Lake Michigan are defined, to determine the short-term effects of the power plant upon the coastal sediments and to provide a base line study which can be used in future years to evaluate the possible long-term effects. Study of the sediments in the area of the Point Beach Nuclear Power Plant revealed the major transport and deposition trends in the region. A base line has been set for future examination of long term consequences of this use of the shore of Lake Michigan. Sand is transported through and past the northern half of the study area to be deposited in the southern half. The fact that the material in the south must move past the discharge plume to reach its site of deposition is of special importance. The heavy mineral data indicate lag deposits forming in the intermediate waters of the southern region rather than in the littoral zone. No disruption of this process by the discharge plume was found. The beach profile site sequences show that changes are occurring which cannot be explained by lake level changes. It is tentatively concluded that the beaches are eroding. Whether or not the water discharge is the direct cause of this phenomenon cannot be stated at this time. (Sinha-OEIS)
W74-02645

BULLETIN AND SUMMARY OF RESEARCH PROGRESS FISCAL YEARS 1970-71.
Army Coastal Engineering Research Center, Washington, D.C.
For primary bibliographic entry see Field 02L.
W74-02647

RESEARCH PERTINENT TO ENVIRONMENTAL QUALITY CONCERNING THE PERIOD, 1967-1971.
Woods Hole Oceanographic Institution, Mass.
For primary bibliographic entry see Field 02L.
W74-02648

DETAILED ANALYSIS OF SHORT-TERM VARIATIONS IN BEACH MORPHOLOGY (AND CONCURRENT DYNAMIC PROCESSES) FOR SUMMER AND WINTER PERIODS, 1971-1972, PLUM ISLAND, MASSACHUSETTS,
Massachusetts Univ., Amherst. Coastal Research Center.
For primary bibliographic entry see Field 02E.
W74-02649

2K. Chemical Processes

DETECTION OF POLLUTANTS IN WATER BY RAMAN SPECTROSCOPY,
Brown, Boveri und Cie, A.G., Heidelberg (West Germany).
For primary bibliographic entry see Field 05A.
W74-02164

OPTICAL CONSTANTS OF WATER IN THE 200-NM TO 200-MICROMETER WAVELENGTH REGION,
Missouri Univ., Kansas City. Dept. of Physics.
G. M. Hale, and M. R. Querry.
Applied Optics, Vol 12, No 3, p 555-563, March 1973. 6 fig, 1 tab, 59 ref.

Descriptors: *Ultraviolet radiation, *Infrared radiation, *Water properties, *Optical properties, Reviews, *Refractivity.
Identifiers: Optical constraints.

Extinction coefficients k (lambda) for water at 25C were determined through a broad spectral region by manually smoothing a point by point graph of k (lambda) vs wavelength lambda that was plotted for data obtained from a review of the scientific literature on the optical constants of water. Absorption bands representing k (lambda) were postulated where data were not available in the vacuum uv and soft x-ray regions. A subtractive Kramers-Kronig analysis of the combined postulated and smoothed portions of the k (lambda) spectrum provided the index of refraction n (lambda) for the spectral region 200 nm less than or equal to (lambda) less than or equal to 200 micrometer.
W74-02167

THE CHEMICAL COMPOSITION AND FLOW OF THE SOUTH WINTERBOURNE IN DORSET,
Freshwater Biological Association, Wareham (England). River Lab.
H. Casey, and P. V. R. Newton.
Freshwater Biol, Vol 2, No 3, p 229-234, 1972, Illus.
Identifiers: *Chemical composition, Flow, *Nitrates, *United Kingdom (South Winterbourne).

Weekly observations were made of the South Winterbourne, England, from Oct. 1970-Dec. 1971. Flow commenced in Nov. 1970, and ceased in July 1971, a maximum flow of 1.51 m3 s-1 being recorded in Jan. 1971. The chemical composition was not very variable, but nitrate showed a positive correlation with flow.--Copyright 1973, Biological Abstracts, Inc.
W74-02190

SOIL POLLUTION FROM CATTLE FEEDLOTS IN GEORGIA,
Georgia Univ., Athens. Dept. of Agronomy.
For primary bibliographic entry see Field 05B.
W74-02210

THE EFFECTS OF TRACE METALS ON GROUND WATER QUALITY AS INFLUENCED BY SOILS REFLECTING DIFFERENCES IN ORGANIC MATTER CONTENT AND GENETIC CONDITIONS,
Tuskegee Inst., Ala.
For primary bibliographic entry see Field 05B.
W74-02211

STRONTIUM, CALCIUM AND THE ISOTOPIC COMPOSITION OF STRONTIUM IN UNDERGROUND WATERS FROM THE SCIOTO RIVER BASIN, OHIO,
Miami Univ., Oxford, Ohio. Dept. of Geology.
For primary bibliographic entry see Field 02F.
W74-02218

STUDY OF THE INTRACELLULAR WATER STATE IN PLANTS UNDER THE EFFECT OF PHENOLS, (IN RUSSIAN),
Voronezhskii Lesotekhnicheskii Institut (USSR).
For primary bibliographic entry see Field 02I.
W74-02234

MIGRATION OF SUBSTANCES WITH SURFACE AND GRAVITATIONAL WATERS IN SOILS OF GEOCHEMICALLY RELATED LANDSCAPES OF BARABA, (MIGRATSIYA VESHCHESTV S PVERKHNOSTNYMI I GRAVITATSIONNYMI VODAMI V POCHVAKH GEOKHIMICHESKI SOPRYAZHENNYKH LANDSHAFTOV BARABY),
Akademiya Nauk SSSR, Moscow. Pochvennyi Institut.
For primary bibliographic entry see Field 02G.
W74-02300

WATER RESOURCES OF LEE COUNTY, MISSISSIPPI,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 04B.
W74-02340

SEPARATION AND IDENTIFICATION OF METAL DITHIZONATES BY THIN-LAYER CHROMATOGRAPHY AND ITS APPLICATION IN TOXICOLOGICAL ANALYSIS,
Chemical Examiner's Lab., Agra (India). Toxicology Div.
For primary bibliographic entry see Field 05A.
W74-02360

EXTRACTION AND SPECTROPHOTOMETRIC DETERMINATION OF VANADIUM AS A MIXED LIGAND COMPLEX OF OXINE AND AZIDE,
Andhra Univ., Waltair (India). Dept. of Chemistry.
For primary bibliographic entry see Field 05A.
W74-02362

PYRIDINE KETOXIMES AS ANALYTICAL REAGENTS: THE SPECTROPHOTOMETRIC DETERMINATION OF COBALT WITH 2--PYRIDYL-2-THIENYL-BETA-KETOXIME,
Windsor Univ. (Ontario). Dept. of Chemistry.
For primary bibliographic entry see Field 05A.
W74-02364

ANALYTICAL APPLICATIONS OF GAS CHROMATOGRAPHY OF METAL CHELATES,
Birmingham Univ. (England). Dept. of Chemistry.
R. S. Barratt.
Proceedings of the Society for Analytical Chemistry, Vol 10, No 7, p 167-170, July 1973. 3 fig, 18 ref.

Descriptors: *Heavy metals, *Beryllium, *Gas chromatography, *Chlorides, *Chelation, Chromium, Nickel, Copper, Cobalt, Separation techniques, Alkaline earth metals.
Identifiers: Detection limits, Recovery, Chemical interference, Chelating agents, Sample preparation, Metal chelates.

A general summary is given of methods of chelating metals, namely Be, Cr, Ni, Cu, and Co for analysis by gas chromatography. Chelating agents, recovery, detection limits, interferences, and chemical structures of several chelates are discussed. The use of gas chromatography for determination of chloride ions is also described. (Little-Battelle)
W74-02366

DETERMINATION OF TRACE AMOUNTS OF CHROMIUM BY ATOMIC ABSORPTION SPECTROMETRY WITH A TANTALUM FILAMENT ATOMIZER,
Nagoya Univ. (Japan). Dept. of Synthetic Chemistry.
T. Maruta, and T. Takeuchi.
Analytica Chimica Acta, Vol 66, No 1, p 5-11, August 1973. 3 fig, 3 tab, 6 ref.

Descriptors: *Chromium, *Aqueous solutions, *Pollutant identification, Heavy metals, Chemical analysis, Alkaline earth metals, Temperature, Methodology, Sodium, Magnesium, Calcium, Strontium, Aluminum, Vanadium, Molybdenum, Manganese, Iron, Cobalt, Nickel, Copper, Cations, Instrumentation.
Identifiers: *Atomic absorption spectrophotometry, *Ionic interference, *Tantalum filament atomizer, Precision, Dectection limits, Sensitivity, Trace levels.

The effect of various foreign ions on chromium absorption in atomic absorption spectrometry was examined with a modified tantalum filament atomizer. The sample solution containing Cr was vaporized and atomized from a tantalum filament by electrical heating into an argon stream within an absorption chamber. All atomic absorption signals were recorded with the height of the absorption signal being used to determine the concentration of Cr. The highest absorption signal was obtained when the filament temperature level (1650 degrees) was the lowest. The detection limit of this method was found to be 0.94 pg and the sensitivity was 0.52 pg. Ten determinations using 6 ppm Cr solution gave a coefficient of variation of 2.8 percent. The effects of 100-, 50- or 10-fold weights of 12 different metal ions on the absorption signal in a 6 ppm Cr solution were measured at various temperatures. No interferences of Fe, Cu, Mn, Al or Na were observed irrespective both of concentrations and filament temperature levels; Fe did not interfere even at a 300-fold amount. No interference was observed at the 10-fold level with the exception of alkaline earth elements and V. The proposed technique is very rapid as a complete single analysis of the aqueous sample requires only 2 min. There are no memory effects between determinations. The most prominent advantages of the proposed method of atomization are its high sensitivity, simplicity and rapidity. (Holoman-Battelle)
W74-02367

EXTRACTION OF BORIC ACID WITH ALIPHATIC 1,3-DIOLS AND OTHER CHELATING AGENTS,
Goteborg Univ. (Sweden). Dept. of Analytical Chemistry.
For primary bibliographic entry see Field 05A.
W74-02368

SAMPLING TECHNIQUES IN CHROMATOGRAPHY,
Waterloo Univ. (Ontario). Dept. of Chemistry.
For primary bibliographic entry see Field 07B.
W74-02372

INTERPRETATION OF INFRARED SPECTA USING PATTERN RECOGNITION TECHNIQUES,
Pennsylvania State Univ., University Park. Dept. of Chemistry.
R. W. Liddell, III, and P. C. Jurs.
Applied Spectroscopy, Vol 27, No 5, p 371-376, September/October 1973. 2 fig, 3 tab, 9 ref.

Descriptors: *Computer programs, *Data processing, *Pollutant identification, *Organic compounds, Computer models, Alcohols.
Identifiers: *Infrared spectra, *Pattern recognition, Carbonyls, Cyclohexanes, Ketones, Esters, Benzene, Ethers, Infrared spectrophotometry.

The pattern recognition technique utilizing adaptive binary pattern classifiers has been applied to the interpretation of infrared spectra for carbonyls, cyclohexanes, alcohols, ketones, esters, benzene, and ethers. The binary pattern classifiers were trained to determine the chemical classes of x-y digitized infrared spectra. High predictive abilities were obtained in classifying unknown spectra. A new training procedure for binary pattern classifiers was developed and used to classify ir spectra into chemical classes. Pattern classifiers trained in the conventional way and by the new procedure were used in conjunction with feature selection, and it is shown that a small fraction of the data is necessary to classify these infrared spectra successfully into chemical classes. (Little-Battelle)
W74-02376

ANALYZING HEAVY ENDS OF CRUDE,
Bureau of Mines, Bartlesville, Okla. Bartlesville Energy Research Center.
For primary bibliographic entry see Field 05A.
W74-02378

ANALYSIS OF HIGH-PURITY WATER BY FLAMELESS ATOMIC-ABSORPTION SPECTROSCOPY. PART II. SIGNAL INTEGRATION WITH A NON-RESONANCE LINE CORRECTION SYSTEM FOR SPURIOUS ABSORPTION PHENOMENA,
European Atomic Energy Community, Ispra (Italy). Joint Nuclear Research Center.
For primary bibliographic entry see Field 05A.
W74-02385

A MODIFIED EXTRACTION METHOD FOR DETERMINATION OF MINERAL OIL IN SEA WATER,
For primary bibliographic entry see Field 05A.
W74-02388

APPLICATIONS, INVOLVING THE IODIDE ION. VIII. DIRECT AND INDIRECT DETERMINATION OF MERCURY (I) AND ANALYSIS OF MIXTURES. ANALYSIS OF CHROMIUM (VI)-CHROMIUM (III) MIXTURES. DETERMINATION OF HYPOCHLORITE,
Cairo Univ., Giza (Egypt). Faculty of Science.
For primary bibliographic entry see Field 05A.
W74-02395

A HIGH-SPEED LIQUID CHROMATOGRAPH WITH A FLOW-SPECTROFLUORIMETRIC DETECTOR AND THE ULTRAMICRO-DETERMINATION OF AROMATIC COMPOUNDS,
Kyoto Univ. (Japan). Dept. of Chemistry.
For primary bibliographic entry see Field 05A.
W74-02397

ION-EXCHANGE SEPARATIONS ON MIXED COLUMNS,
Tokyo Univ. (Japan). Inst. of Industrial Science.
For primary bibliographic entry see Field 05A.
W74-02398

DETERMINATION OF ZINC BY FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETRY,
Ohio State Univ., Columbus. Coll. of Medicine.
For primary bibliographic entry see Field 05A.
W74-02399

NUCLEAR MAGNETIC RESONANCE RELAXATION TITRATION,
Technische Hochschule, Darmstadt (West Germany). Eduard-Zintl-Institut.
A. Schluter, and A. Weiss.
Zeitschrift fur Analytische Chemie, Vol 266, No 3, p 177-186, August 30, 1973. 8 fig, 1 tab, 24 ref.

Descriptors: Methodology, *Aqueous solutions, Chemical precipitation, Chemical analysis, Chemical reactions, *Nuclear magnetic resonance, Volumetric analysis, Visosity, Iron, Nickel, Copper, Pollutant identification.
Identifiers: Quantitative analysis, *NMR relaxation titration, Paramagnetic ions, *Metal complexes, Accuracy, Detection limits, Chemical concentration, Sensitivity, Dichromates, Cerium, Complexometric titration, Redox titration, alpha-Benzoinoxime, Complexation.

Quantitative determination of the concentration of paramagnetic ions in aqueous solutions is performed by NMR relaxation titration. By measurement of the nuclear spin-lattice relaxation time T sub 1 or the nuclear spin-spin relaxation time T sub 2 redox titrations and complexometric determinations of the concentration of paramagnetic ions are possible. Also the precipitation of ions from the solution can be followed by this method. The use of a magnetic indicator in this analytical method is shown. The sensitivity of the method goes down to concentrations as low as 0.001 M. The accuracy of NMR relaxation titration is better than 1 percent. A number of applications of the method are given. (Holoman-Battelle)
W74-02402

SELECTION OF EXPERIMENTAL CONDITIONS FOR THE PHOTOMETRIC COMPLEX FORMATION TITRATIONS OF METALS IN THE PPM-RANGE,
Amsterdam Univ. (Netherlands). Physics Lab.
For primary bibliographic entry see Field 05A.
W74-02404

ANALYSIS BY MEANS OF GAS BUBBLE ELECTRIFICATION,
Imperial Coll. of Science and Technology, London (England). Dept. of Metallurgy.
D. A. Pantony, and D. C. Stagg.
Zeitschrift fue Analytische Chemie, Vol 264, No 5, p 348-353, June 13, 1973. 8 fig, 1 tab, 7 ref.

Descriptors: *Chemical analysis, *Solutes, *Aqueous solutions, *Volumetric analysis, Electrolytes.
Identifiers: *Gas bubble electrification, Acid-base titration, Complexiметric titration, Acetic acid, Nickel chloride, Trisodium trimetaphosphate, Trisodium orthophosphate, Tetrasodium pyrophosphate, Pentasodium triphosphate, Titrimetry.

A simple theory is proposed to account for the reciprocal relationship between concentration of solute and the charge on a droplet ejected as a rising bubble bursts at a solution's surface. Reasonable agreement is found between theoretical predictions of charge in multivalent electrolytes and the experimental values. Application to continuous analysis of flowing systems and to end-point detection is demonstrated for acid-base and complexiметric titrations. (Holoman-Battelle)
W74-02406

A PNEUMATIC SAMPLE CHANGER FOR GAMMA-RAY SPECTROSCOPY,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07B.
W74-02407

HANGING MERCURY DROP ELECTRODEPOSITION TECHNIQUE FOR CARBON FILAMENT FLAMELESS ATOMIC ABSORPTION ANALYSIS. APPLICATION TO THE DETERMINATION OF COPPER IN SEA WATER,
Texas Univ., Austin. Dept. of Chemistry.
C. Fairless, and A. J. Bard.
Analytical Chemistry, Vol 45, No 13, p 2289-2291, November 1973. 2 fig, 1 tab, 25 ref.

Descriptors: *Copper, *Seawater, *Chemical analysis, Methodology, *Pollutant identification, Trace elements, *Electrochemistry, Heavy metals, Water analysis, Electrolysis, Laboratory equipment, Pollutants, Water pollution.
Identifiers: Hanging mercury drop electrode, Carbon filament, Flameless atomic absorption spectrophotometry, Controlled potential electrolysis, Detection limits, Accuracy, Electrodeposition, Volatilization, Precision.

Controlled potential electrolysis at a hanging mercury drop electrode (HMDE) has been coupled with carbon filament atomic absorption as an analytical technique and applied to the determination of Cu in seawater. Synthetic seawater and natural seawater samples were analyzed. Timed electrolyses at a controlled potential of -0.35 V vs. SCE were conducted with a simple three-electrode arrangement. Deaeration of analysis solutions was accomplished by bubbling N2 for 5 min prior to electrolysis and then by passing N2 over the solution during electrolysis. After electrolysis. After electrolysis relaxation losses were examined. Five microliters of p-xylene was used to pretreat the filament cavity. The mercury was volatilized completely by heating the filament at approximately 425 C, then the Cu was atomized. Accuracy was checked by the standard additions method. The natural seawater analysis gave 0.72 microgram Cu/l which is within the range for unpolluted seawater. The practical detection limit for this technique with this electrode configuration, solution volume, and electrolysis time is 0.2 microgram Cu/l. The absolute detection limit of the carbon filament atomizer is about 0.5 pg of Cu (essentially the same value as the sensitivity per 1 percent absorption). These results indicate that this is a suitable technique for the determination of Cu in unpolluted seawater with matrix interferences apparently eliminated and selective volatilization of Hg without covolatilization of Cu accomplished. In addition, in this technique, sample size is limited only by the electrolysis apparatus configuration, total amount of trace metal, and time, and is not restricted to the microliter capacity of the carbon filament. (Holoman-Battelle)
W74-02411

ADSORPTION CHARACTERISTICS OF SILBER, LEAD, CADMIUM, ZINC, AND NICKEL ON BOROSILICATE GLASS, POLYETHYLENE, AND POLYPROPYLENE CONTAINER SURFACES,
Chadron State Coll., Neb.
For primary bibliographic entry see Field 05A.
W74-02412

HIGH PRECISION SAMPLING FOR CHROMATOGRAPHIC SEPARATIONS,
National Bureau of Standards, Washington, D.C. Analytical Chemistry Div.
B. E. Bowen, S. P. Cram, J. E. Leitner, and R. L. Wade.
Analytical Chemistry, Vol 45, No 13, p 2185-2191, November 1973. 10 fig, 4 tab, 42 ref.

Descriptors: *Separation techniques, *Chromatography, *Automatic control, Computers, Hydraulic valves, High pressure valves, Gas chromatography, Data collections, Algorithms, Flow rates, Sampling, Digital computers.
Identifiers: Precision, *Chromatographic sampling valves, Hybrid-fluidic valves, Data acquisition, Hamilton valves, Carrier gas.

The precision of several chromatographic sampling valves of original design is shown to approach 0.05 percent for unretained solutes. Hybrid-fluidic, high pressure, and commercial valves have been characterized by measuring the precision of their column input profiles and statistical moments. A computer-based data acquisition and control system was developed for use the high precision algorithms. (Holoman-Battelle)
W74-02414

EXPERIMENTAL STUDY OF THE PHASE--SELECTIVE ANODIC STRIPPING ANALYSIS OF MICROMOLAR CADMIUM (II) AT THE MICROMETER HANGING MERCURY DROP ELECTRODE IN 0.1 M POTASSIUM CHLORIDE,
Kentucky Univ., Lexington. Dept. of Chemical Engineering.
E. D. Moorhead, and P. H. Davis.
Analytical Chemistry, Vol 45, No 13, p 2178-2184, November 1973. 5 fig, 3 tab, 28 ref.

Descriptors: *Cadmium, *Chemical analysis, *Electrochemistry, *Aqueous solutions, Electrolytes, Heavy metals, Methodology, Electrolysis, Trace elements.
Identifiers: Hanging mercury drop electrodes, Phase-selective anodic stripping, as Phase-selective voltammetry, Chemical concentration, Trace levels, Reproducibility, Sensitivity, Anodic stripping voltammetry, as Polarography, Potassium chloride.

Conflicting reports in the literature pertaining to the observed magnitude of the ac phase-selective current obtained in the anodic stripping of Cd from the HMDE prompted an experimental reassessment of the stripping behavior of this metal using a micrometer-type HMDE and 0.1 M KCl as base electrolyte. Reproducibility of the stripping analysis was indicated by a 1.20 percent average deviation in the measured peak height obtained for ten independent runs at the micromolar Cd (II) level. The functional dependence of peak height on signal frequency, applied ac voltage, and cadmium concentration conformed to theory developed previously for ac polarography. However, observed in-phase peak currents obtained during the stripping step were substantially smaller than those reported by previous authors for the same experiment. The influence of stripping scan rate on the Cd-Cd (Hg) system was examined, and peak heights were found to be strongly dependent on this parameter. The importance of maintaining well-controlled conditions during pre-electrolysis was indicated from brief studies of peak height dependence on solution volume and stirring rate. (Holoman-Battelle)
W74-02415

AN AUTOMATED ANALYSIS FOR UREA IN SEAWATER,
Oregon State Univ., Corvallis. School of Oceanography.
For primary bibliographic entry see Field 05A.
W74-02421

SALINITY CORRECTIONS FOR DISSOLVED OXYGEN MEASUREMENTS,
National Oceanographic Instrumentation Center, Washington, D.C.
For primary bibliographic entry see Field 05A.
W74-02424

COMPARING THE QUALITY OF OUR WATERS,
Orlando Labs., Inc., Fla.
For primary bibliographic entry see Field 05A.
W74-02428

POTENTIALITY OF THE COUPLING OF COLUMN LIQUID CHROMATOGRAPHY AND FIELD DESORPTION MASS SPECTROMETRY,
Bonn Univ. (West Germany). Institut fuer Physikalische Chemie.
H. D. Beckey.
Journal of Chromatography, Vol 83, p 315-320, August 29, 1973. 6 fig, 16 ref.

Descriptors: *Separation techniques, *Organic compounds, *Pollutant identification, *Mass spectrometry, Molecular structure, *Chromatography.
Identifiers: Column liquid chromatography, Field desorption mass spectrometry, Sample preparation, F mass spectra, Detection limits, Steroids, Molecular ions, Mass spectra, Spectrophotometric detector, Corticosterone, Progesterone, Prednisolone, Desorption, Ionization.

The first use of column liquid chromatography in combination with field desorption mass spectrometry is exemplified by the separation and identification of the components of a steroid mixture extracted from rat serum. There are two main reasons for the high-molecular-ion intensities obtained: (1) the smaller transferred energy in the field ionization process compared with other ionization modes increases the chance of detecting the intact molecular ions; and (2) the samples are not introduced via the commonly used direct introduction system for evaporation, but are applied to the field ion emitter from a solution using the emitter dipping technique. Hence ionization and desorption of the adsorbed molecules can be performed with minimum thermal stress. Potential applications for the coupling of liquid chromatography and field desorption mass spectrometry are discussed, especially in relation to the handling of the sample and the limits of detection. (Holoman-Battelle)
W74-02430

ANIONIC EXCHANGE SEPARATIONS OF THE ELEMENTS THAT CAN BE EXTRACTED WITH TRIBUTYL PHOSPHATE. II, (ANIONENAUSTAUSCHTRENNUNGEN DER MIT TRIBUTYLPHOSPHAT EXTRAHIERBAREN ELEMENTE. II),
Vienna Univ. (Austria). Analytisches Institut.
W. Koch, and J. Korkisch.
Mikrochimica Acta, No 1, p 101-112, 1973. 3 fig, 4 tab, 14 ref.

Descriptors: *Chemical analysis, *Separation techniques, *Spectrophotometry, Ion exchange, Aqueous solutions, Adsorption, *Anion exchange.
Identifiers: *Germanium, Chemical interference.

A very sensitive and selective method for the spectrophotometric determination of germanium has been described employing pyrocatechol violet. Prior to the determination, the germanium is first accumulated by extraction with tributyl phosphate (TBP) and kerosene and then separated from the co-extracted elements that interfere with the determination, by means of the strongly basic anion-exchanger Dowex 1,X8 in a mixture consisting of 30 vol. percent TBP, 60 vol. percent methlglycol and 10 vol. percent 12 N hydrochloric acid. In addition it was shown that this mixture is well suited to separate uranium quantitatively from germanium. The spectrophotometric determination of germanium is interfered with by V (V), Mo (VI), Ga (III), Tl (III), Sb (III), Sn (II) and Fe (III). The interference by iron can be averted by adding sodium-potassium tartrate. (Little-Battelle)
W74-02432

NATURE AND STABILITY OF COMPLEX MERCURY COMPOUNDS IN SURFACE AND GROUND WATERS,
Auburn Univ. Ala. Dept. of Chemistry.
For primary bibliographic entry see Field 05A.
W74-02441

NITROGEN, PHOSPHORUS, AND TRACE ELEMENTS IN FLORIDA SURFACE WATERS, 1970-71,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 05A.
W74-02476

HYDROLOGY AND WATER RESOURCES OF THE NEPONSET AND WEYMOUTH RIVER BASINS, MASSACHUSETTS,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07C.
W74-02480

ON THE CHARACTERISTICS OF SALT INTRUSION IN THE KITAKAMI RIVER, MIYAGI PREFECTURE (IN JAPANESE),
Japanese Society of Limnology, Otsu (Japan).
For primary bibliographic entry see Field 05B.
W74-02541

OCCURRENCE OF SILICA IN THE NATURAL WATERS OF THE HUNTLEY-ROBERTSON DISTRICT, SOUTHERN NEW SOUTH WALES,
New South Wales Dept. of Mines, Sydney (Australia). Chemical Lab.
M. Johnson, and W. D. Johnson.
Aust J Mar Freshwater Res. Vol 23, No 2, p 105-119. 1972. Illus.
Identifiers: *Australia (N.S.W.), Natural waters, *Silica.

The silica concentrations of both ground and surface waters from the Triassic Hawkesbury Sandstone (New South Wales, Australia) were found to range from 3.0-12.0 ppm. Samples of soil, surface bedrock, and fresh core material were leached with water, and the results of chemical analyses carried out on the subsequent solutions are discussed with reference to the source of the silica is solution. A time study of the release of soluble silica from sandstone indicated rapid dissolution within the first few days, with equilibrium concentration being reached after a period of several weeks due to inhibiting surface reaction on the mineral grains. A possible explanation, based on the effects of weathering and the impervious nature of the sandstone, is suggested to account for the similarity between the silica concentrations of surface water and groundwater.--Copyright 1973, Biological Abstracts, Inc.
W74-02555

TOTAL ISOTOPIC COMPOSITION AND HYDROCHEMICAL CHARACTERISTICS OF NATURAL WATERS IN NORTHWESTERN AND NORTHERN FERGANA (SUMMARNYY IZOTOPNYY SOSTAV I GIDROKHIMICHESKIYE OSOBENNOSTI PRIRODNYKH VOD SEVERO-ZAPADNOY I SEVERNOY FERGANY),
Tashkent Univ. (USSR).
A. S. Uklonskiy, V. I. Popov, S. T. Badalov, L. D. Shpora, and V. M. Glushchenko.
Uzbekskiy Geologicheskiy Zhurnal, No 1, p 60-63, 1973. 4 ref.

Descriptors: *Water chemistry, *Water quality, *Isotope studies, *Structural geology, Folds (Geologic), Geologic time, Metals, Oxygen, Mixing, Oily water, Meteoric water, Water analysis, Water sampling.
Identifiers: *USSR, *Fergana.

The presence of a relation between isotopic and chemical composition of waters makes it possible to (1) determine boundaries of modern transgressions and regressions of oily water, (2) locate discharge areas of groundwater of varied origin, and (3) identify mixing zones of descending oxygen and ascending oxygen-free waters. Favorable geochemical barriers for precipitation of ores of many elements can be constructed in mixing zones of descending oxygen and ascending oxygen-free waters. On the basis of isotopic and chemical composition of waters, four regions favorable to formation of deep mixing zones are identified: the Varzyk ore region of copper-bearing sandstone; the southeastern limb of the Chustpapskaya anticline (from Kattasay to Almassay); the pericline and periclinal strata of the northwestern limb of Supetau; and the pericline and southeastern limb of the Karagundayskiy structural nose. (Josefson-USGS)
W74-02608

CHEMICAL CHARACTERISTICS OF SURFACE WATERS IN THE UPPER CHIRCHIK RIVER BASIN (KHIMICHESKAYA KHARAKTERISTIKA POVERKHNOSTNYKH VOD VERKHNEY CHASTI BASSEYNA R. CHIRCHIK),
Akademiya Nauk Ubzekskoi SSR, Tashkent. Institut Seismologii.
G. Kh. Umarova.
Uzbekskiy Geologicheskiy Zhurnal, No 3, p 34-37, 1973. 2 tab, 3 ref.

Descriptors: *Surface waters, *Water chemistry, *Water quality, *Water properties, Water types, Water analysis, Chemical analysis, Inorganic compounds, Ions, Water sampling.
Identifiers: *USSR, *Chirchik River.

Water samples were collected and analyzed to determine the chemical composition of surface waters of the Ugam, Bel'dershay, Chimgansay, Avgansay, and other rivers in the Chirchik River basin in Uzbekistan. The salinity of the waters is weak (0.220-0.285 g/liter). The maximum amount of dissolved solids is 0.575 g/liter (lower reaches of the Azadbashsay River). The chemical composition of the waters is of the bicarbonate-sulfate-calcium-magnesium (predominant) and bicarbonate-sulfate-sodium-magnesium types. Hydrogen ion concenttation is 7.8-8.2. Hardness characteristics range from soft to moderately hard. The chemical composition of the waters is directly correlated with the lithological composition of the rocks comprising the region. Results of chemical analyses of water samples collected from upper reaches of the Chirchik River are tabulated. (Josefson-USGS)
W74-02612

SUMMARY OF HYDROLOGIC CONDITIONS IN COLLIER COUNTY, FLORIDA, 1972,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 02A.
W74-02622

2L. Estuaries

DISPERSION IN FLOW FROM A CONTINUOUS SOURCE AT SEA,
Liverpool Univ. (England). Dept. of Oceanography.
For primary bibliographic entry see Field 05B.
W74-02163

APPROACHES TO STATE COASTAL MANAGEMENT,
Rhode Island Univ., Kingston. Coastal Resources Center.
M. J. Grant.
Available from NTIS, Springfield, Va. 22151 as COM-73-10511 - Price $3.00 printed copy; $1.45

microfiche. Rhode Island University Marine Bulletin, Series No. 13, January 1973. 7 p, 2 tab.

Descriptors: *Coastal engineering, *Shore protection, *Projects, *State governments, Beach erosion, Erosion control, Sediment control, Reviews, Management.

This summary examination of the peculiarities of individual state approaches to coastal management is divided into: (1) no significant activity, (2) comparable efforts, (3) planning, (4) moratorium, (5) active management, and (6) State guidelines-local action. (Woodard-USGS)
W74-02185

A SELF-DRAINING SUBSURFACE RAINFALL CONSERVATION SYSTEM: ITS EFFECT ON THE SOIL WATER STATUS AND PRODUCTIVITY OF COASTAL PLAINS SANDS,
Rhodesia Univ., Sailsbury. Dept. of Agriculture.
For primary bibliographic entry see Field 02G.
W74-02193

APPLICABILITY OF THE INTERCEPTOR WATERWAY CONCEPT TO THE ROOKERY BAY SANCTUARY,
Tropical Bioindustries Development Co., South Miami, Fla.
For primary bibliographic entry see Field 04A.
W74-02205

BOLINAS LAGOON, MARIN COUNTY, CALIFORNIA, SUMMARY OF SEDIMENTATION AND HYDROLOGY, 1967-69,
Geological Survey, Menlo Park, Calif.
J. R. Ritter, and W. M. Brown, III.
Available from NTIS, Springfield, Va. 22151, PB-224 080/AS; Price $3.00 printed copy; $1.45 microfiche. Water-Resources Investigations 19-73, August 1973. 74 p, 32 fig, 7 tab, 103 ref.

Descriptors: *Sedimentation rates, *Hydrology, *Lagoons, *California, Sediment transport, Tidal effects, Estuaries, Erosion, Littoral drift, Winds, Sands, Topography, Vegetation, Streamflow, Hydrologic data, Sediment load.
Identifiers: *Bolinas Lagoon (Calif.).

Sedimentation in Bolinas Lagoon, a 1,100-acre lagoon 15 miles northwest of San Francisco, presently averages about 16 acre-feet per year. This value has been determined from rates of 21 acre-feet per year from net sediment budget studies, 16 acre-feet per year from topographic surveys of the lagoon bottom in 1939 and 1968, and 11 acre-feet per year computed from geological evidence. At the indicated rates the deposition in the lagoon would average 0.5 to 1.0 foot in the next 50 years, and the lagoon would fill to the highest high water level in 340 to 650 years. Studies from 1967 to 1969 indicated that approximately 80 acre-feet of sediment was transported into and 86 acre-feet was transported out of Bolinas Lagoon annually by tidal flows. Cliff erosion west of the inlet and littoral drift provided the principal sources of the sediment transported into the lagoon flood-tides. Winds and streamflow brought additional sediment into the lagoon, and shore erosion contributed a minor part. Measurements of tidal flows and suspended-sediment discharge in the lagoon inlet showed that: (1) most of the suspended sediment is sand, (2) the average velocity was as much as 4.9 feet per second, (3) instantaneous suspended-sediment discharge reached rates as large as 11,600 tons per day on an ebbtide, (4) tidal flows ranged from 180 to 2,800 acre-feet, and (5) corresponding suspended-sediment discharge ranged from 3 to 1,200 tons. (Woodard-USGS)
W74-02296

SURFACE AND INTERNAL WAVES, (POVERKHNOSTNYYE I VNUTRENNIYE VOLNY),
Akademiya Nauk URSR, Sevastopol. Marine Hydrophysics Inst.
For primary bibliographic entry see Field 02E.
W74-02299

WATER RESOURCES DEVELOPMENT IN THE MULLICA RIVER BASIN,
College of South Jersey, Camden. Dept. of Zoology.
For primary bibliographic entry see Field 05C.
W74-02450

RESEARCH IN THE COASTAL AND OCEANIC ENVIRONMENT,
Delaware Univ., Newark.
W. S. Gaither.
Available from NTIS, Springfield, Va. 22151 as AD-759 878 Price $3.00 printed copy; $1.45 microfiche. Annual Status Report, September 1971. 28 p, 12 fig, 8 ref. ONR N00014-69-10040Z.

Descriptors: *Littoral drift, *Sediment transport, *Coasts, *Delaware, Environmental effects, Vegetation effects, Ocean currents, Tidal effects, Estuaries, Geomorphology, Data collections, Sedimentation, Soil types, Waves (Water), Coastal marshes, Phosphates, Biochemistry, Shores, New Jersey, Maryland, Correlation analysis, Evaluation, Environmental control.

Progress during the second year of a multidisciplinary study of a section of the Atlantic seacoast (Delaware and adjacent areas of New Jersey and Maryland) is summarized. New knowledge of coastal geology and geologic history has been developed, and the properties of soils sediments in nearshore, beach, and backshore locations have been more fully determined. Continued theoretical investigations of wave action, model studies of sedimentary processes and underground water behavior, and the results of additional observations of vegetative growth and of surface energy exchanges are reported. Future objectives, particularly in the area of coastal zone remote sensing, are outlined. This study, sponsored by the Geography Branch of the Office of Naval Research, is intended to provide thorough basic knowledge of this representative coastal zone that can be applied to similar littoral areas throughout the world to identify offshore, tidal zone, beach, and backshore surface and subsurface features from limited and preferably remote observations. (Woodard-USGS)
W74-02481

GUIDELINES FOR THE COASTAL ZONE.
Coastal Plains Center for Marine Development Services, Wilmington, N.C.

Publication 73-5 July 1973. 14 p.

Descriptors: *Coastal plains, *Land use, *Land classification, *Water use, Land resources, Land development, Water resources development, Zoning, Land management, Water management, Comprehensive planning, Social aspects, Political aspects, Multiple-purpose projects.
Identifiers: Coastal zone management.

The Coastal Zone Management Act, which became law in October of 1972, encourages states to develop tools for the long-term planning and management of invaluable and irreplaceable coastal resources. To assist the coastal states, grants were authorized for the development of a coastal zone management program including a comprehensive statement in words, maps, illustrations, and other media of communication setting forth objectives, policies, and standards to guide public and private uses of lands and waters in the coastal zone. The primary purposes of the publication are to assist in the development of such plans, and to provide guidelines for coastal zone use and development. The guidelines comprised two major parts. First, the section on classifications of land and water addresses the questions of whether development is suitable at all and if so, what types and in what areas; and if not, what other uses are suitable. Secondly, the section on usage considerations deals primarily with how development should take place, precautions needed to be taken, and the rationale which supports this criterion. (Daniels-Florida)
W74-02510

USE OF ERTS-1 IN COASTAL STUDIES,
Army Coastal Engineering Research Center, Washington, D.C.
O. T. Magoon.
In: Proceedings of NASA/Goddard Space Flight Center ERTS-1 Symposium, September 29, 1973. p 108-116, 1973. 11 ref, 4 plates.

Descriptors: Natural resources, *Photography, *Coasts, Barrier islands, *Shallow water, *Waves (Water), *Satellites (Artificial), *Remote sensing.
Identifiers: ERTS-1 imagery.

A few possibilities of the use of ERTS-1 imagery in coastal studies are summarized. An obvious application is in obtaining regional views of extended coastal areas. Other applications referred to are coastal configuration, barrier islands, underwater penetration, and coastal waves. Samples of ERTS-1 imagery are included. (Sinha-OEIS)
W74-02633

SEASONAL AND AREAL DISTRIBUTION AND ABUNDANCE OF THE COPEPODA IN A MISSISSIPPI ESTUARINE SYSTEM,
Mississippi Marine Conservation Commission, Biloxi.
H. M. Perry.
Available from NTIS as COM-72-11175, $3.00 in paper copy; $1.45 in microfiche. MS thesis, University of Southern Mississippi, June 1970. 80 p, 12 fig, 13 tab, 59 ref, append. NOAA, NMFS 2-25-R.

Descriptors: *Bioindicators, Mississippi, Coasts, *Ecological distribution, *Copepods, Seasonal Spatial distribution, Hydrography, *Estuaries, *Sounds, *Crustaceans, Inland waterways, Pollutant identification, Water pollution.
Identifiers: *Mississippi Sound.

Copepoda are crustaceans of special interest because of their possible use as biological indicators of specific water masses. A knowledge of the seasonal and areal distribution and abundance of these organisms in the Mississippi Sound would serve a useful purpose not only from the standpoint of commercial fisheries, but also from the standpoint that they may be useful tools for making inferences concerning the hydrography of this area in future studies. The purposes of this investigation were to determine: (1) the various species of free-living copepods present in the area of Mississippi Sound under study; (2) the numerical abundance of each species determined monthly for a period of one year; (3) the seasonal and areal distribution and abundance of these organisms; and (4) the physical conditions under which each species occurs. (Sinha-OEIS)
W74-02637

WAVE BREAKING IN SHALLOW WATER,
Army Coastal Engineering Research Center, Washington, D.C.
C. J. Galvin, Jr.
In: Waves on Beaches and Resulting Sediment Transport, Academic Press, Inc., 1972. p 413-456. 12 fig, 5 tab, 50 ref.

Descriptors: *Waves (Water), *Shallow water, *Beaches, *Coasts.

Identifiers: Wave speed, *Breakers, Solitary waves, Beach slope, Oscillatory waves, Wave shape.

Deep water steepness and beach slope determine breaker type and breaker depth-to-height ratio. High initial deep water steepness induces breaking in deeper water since steepness grows faster than height. Slope determines the extent of nonlinear changes in wave shape, which occur at a slow rate relative to wave speed. Slow shape changes accompanying soliton development significantly affect the breaking of oscillatory waves and provide plausible explanations for data on the breaking of solitary waves. Empirical knowledge of the breaking process is summarized for reference by those preparing theoretical studies of the breaking process. (Sinha-OEIS)
W74-02638

PUGET SOUND RESIDENT COHO SALMON STUDY,
Washington State Dept. of Fisheries, Olympia.
F. Haw.
Available from NTIS as COM-72-11060, $3.00 in paper copy; $1.45 in microfiche. Completion Report, August 1970. 12 p, 4 fig, 6 tab. NOAA, NMFS AFC-35.

Descriptors: *Washington, Salmon, Fish populations, *Sounds, Recreation, Sport fish, *Migration, Estuarine fisheries, Coasts, *Fish management, Fisheries, Resources development.
Identifiers: *Coho salmon, *Puget Sound (Wash).

Fin-marking studies have indicated that the coho salmon artificially produced in Puget Sound hatcheries tend to move out to forage along the outer coast of British Columbia and Washington, while the in-Sound resident population results primarily from certain natural spawning races. When the hatchery-produced fish return to Puget Sound on their spawning migration, they are no longer feeding and are thus difficult to catch on sport gear. (Sinha-OEIS)
W74-02639

DEVELOPMENT OF A MATHEMATICAL MODEL TO PREDICT THE OCCURRENCE OF CYNOSCION ARENARIUS IN MISSISSIPPI ESTUARIES,
Mississippi Marine Conservation Commission, Biloxi.
C. K. Eleuterius.
Available from NTIS as COM-72-11197, $3.00 in paper copy; $1.45 in microfiche. MS thesis, University of Southern Mississippi, August 1970. 38 p, 11 fig, 2 tab, 40 ref. NOAA, NMFS 2-25-R.

Descriptors: *Estuaries, *Fisheries, *Sounds, *Mathematical models, Environmental effects, Salinity, Temperature, Fish management, Mississippi, *Fish migration, Trout, Oxygen, Phosphates, Estuarine fisheries, Coasts.
Identifiers: *Mississippi Sound, *Cynoscion arenarius, Trash fish, White trout.

The non-random distribution of C. arenarius in Mississippi Sound confounds attempts at prediction using data collected from randomly assigned fixed stations. The occurrence of white trout is highly correlated with the density of the surrounding water as well as the rate of change in density. This is probably because of the osmotic mechanism that controls the concentration of the blood as well as the maintenance of internal water. Salinities in Mississippi Sound are within the tolerable range of the species throughout the year. Temperature as stated by Gunter (1945) is evidently the triggering factor to the migratory behavior of C. arenarius from the shallow Gulf into Mississippi Sound. The preference of white trout for certain bottom types probably because of the availability of food, is not unknown to local sport and commercial fishermen. Availability of food, current speeds, wind direction and force, pH and tide are additional factors that should be considered in reducing the amount of unexplained variation in improving the model to predict the occurrence of C. arenarius. (Sinha-OEIS)
W74-02640

DESIGN CONSIDERATIONS FOR A 3-D LASER DOPPLER VELOCIMETER FOR STUDYING GRAVITY WAVES IN SHALLOW WATER,
Army Coastal Engineering Research Center, Washington, D.C.
R. J. Hallermeier.
Applied Optics, Vol 12, No 2, p 294-300, February 1973. 5 fig, 27 ref.

Descriptors: *Gravity waves, *Waves (Water), *Shallow water, *Instrumentation.
Identifiers: *Laser Doppler velocimeter, Optics, Light scattering, Velocimeters, Fluid velocity.

A laser velocimeter system using three frequency-modulated light beams and one detector for measurement of the instantaneous velocity vector in reversing flow is considered. An analysis of the scattering and detection processes by means of the Mie and optical mixing theories is outlined. A system proposed for gravity wave studies uses an argon-ion laser and three Bragg cells as a source and a photomultiplier detector of the light backscattered from 0.2-micrometer-diameter spheres, introduced into the flow in a low concentration, and can measure local velocity vectors of magnitude between 0.1 m/sec and 3.0 m/sec, with turbulent fluctuations of 1% or greater intensity. (Sinha-OEIS)
W74-02642

INSECT PEST MANAGEMENT IN COASTAL AND ESTUARINE HABITATS,
North Carolina State Univ., Raleigh. Dept. of Entomology.
For primary bibliographic entry see Field 05G.
W74-02643

AN ANNOTATED BIBLIOGRAPHY OF AERIAL REMOTE SENSING IN COASTAL ENGINEERING,
Clemson Univ., S.C. Dept. of Civil Engineering.
D. B. Stafford, R. O. Bruno, and H. M. Goldstein.
Army Coastal Engineering Research Center, Miscellaneous Paper No. 2-73, May 1973. 122 p, 1 tab, 200 ref.

Descriptors: *Coastal engineering, *Remote sensing, Bibliographies, Abstracts, *Aerial photography, Satellites (Artificial), *Coasts, *Beaches, Ecology, *Estuaries.
Identifiers: *Remote sensors, *Nearshore processes.

This bibliography covers representative literature on the applications of aerial remote sensing techniques to coastal engineering. About 200 references published since 1934 are presented. Annotations accompany each bibliographic entry and are a concise and informative summary of the references describing the characteristics of each remote sensor in coastal engineering investigations. Computer indexes of authors, titles, and keywords are included. (Sinha-OEIS)
W74-02646

BULLETIN AND SUMMARY OF RESEARCH PROGRESS FISCAL YEARS 1970-71.
Army Coastal Engineering Research Center, Washington, D.C.

Bulletin IV, March 1973. 48 p.

Descriptors: *Coasts, Shores, *Waves (Water), Surges, *Estuaries, Ecology, *Shore protection, *Coastal engineering, *Sediment transport.
Identifiers: Wind waves.

A summary is presented of progress in coastal engineering research at Coastal Engineering Research Center (CERC) for FY's 1970-71. Included are summaries of research and development programs on wind-wave action in coastal waters, shore processes, long-period waves and surges, inlet and estuary dynamics, coastal ecology studies, shore protection, offshore structures, and environmental data collection. Reports are presented on CERC support activities including automatic data processing, and technical and administrative services. CERC publications for FY's 70-71 are listed. (Sinha-OEIS)
W74-02647

RESEARCH PERTINENT TO ENVIRONMENTAL QUALITY CONCERNING THE PERIOD, 1967-1971.
Woods Hole Oceanographic Institution, Mass.

Available from NTIS as PB-210 851, $3.00 in paper copy, $1.45 in microfiche. Technical Report WHOI-72027, May 1972. 60 p.

Descriptors: Pollution abatement, *Coasts, *Bibliographies, Aquatic environment, Estuarine environment, *Water quality, Ecology, *Environmental effects.
Identifiers: Coastal zone, Environmental quality.

The activities of the staff of the Woods Hole Oceanographic Institution in the area of environmental quality for the period 1967-1971 are presented. The first section of the report is a bibliography of papers published during this time; the second section lists the unpublished mimeographed reports, the so-called Blue Cover Reports; and the third section lists other activities such as participation in educational programs, papers presented at scientific meetings, membership on national or international advisory or consultative committees, and congressional testimonies. (Sinha-OEIS)
W74-02648

03. WATER SUPPLY AUGMENTATION AND CONSERVATION

3A. Saline Water Conversion

PURIFICATION OF EFFLUENTS BY MEANS OF REVERSE OSMOSIS, (OCHISTKA STOCHNYKH VOD METODOM OBRATNOGO OSMOSA),
For primary bibliographic entry see Field 05D.
W74-02258

ION EXCHANGE AND ALLIED PROCESSES IN WATER RECOVERY,
Permutit Co. Ltd., London (England).
For primary bibliographic entry see Field 05D.
W74-02268

IMPROVING REVERSE OSMOSIS PERFORMANCE WITH DYNAMICALLY FORMED WOOD CHEMICAL MEMBRANES,
Institute of Paper Chemistry, Appleton, Wis.
For primary bibliographic entry see Field 05D.
W74-02286

THE USE OF DESALTED SEAWATER FOR INTENSIVE AGRICULTURAL APPLICATIONS, (EL USO DE AGUA DE MAR DESALADA PARA INTENSIVAS APLICACIONES AGRICOLAS),
Arizona Univ., Tucson. Environmental Research Lab.
C. N. Hodges, and C. Pena.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 39 p, 7 fig, 8 tab, 6 ref.

Descriptors: *Arid lands, Desalination, *Agriculture, Electric powerplants, *Desalination plants, *Saline water, Water supply, Water supply development, Electric power production, Multiple purpose, Regional development, Greenhouses, Growth chambers.
Identifiers: *Mexico (Sonora), Abu Dhabi.

The University of Arizona and the University of Sonora have conducted a cooperative project investigating the desalting of seawater in the arid northwest Mexico. The study began in 1963 in Puerto Penasco, Sonora, Mexico, where originally solar desalination experiments were conducted. Large plastic bubble greenhouses with controlled environments were constructed and cabbages, cucumbers, and other vegetables were cultivated. After completion of the solar energy experiments, the plant was converted to diesel power. In 1969 Abu Dhabi (United Arab Emirates) extended a grant to the University of Arizona to construct a larger power/water/food plant based on the Puerto Penasco plant studies. An Arid Lands Research Center has been established there, and a plant with 48 greenhouses similar to those in Mexico was constructed. Crops like those in Puerto Penasco planted directly into cleaned beach sand came under full production in early 1972,with large yields of fruit and vegetables. The experience with both the Mexican and Arabian installations has been positive, indicating that such multiple-purpose plants have great application in areas where power, water, and high nutrient vegetables are scarce. (Muller-Arizona)
W74-02359

ANOTHER RIO GRANDE FOR NEW MEXICO,
Los Alamos Scientific Lab., N. Mex.
L. P. Reinig, R. I. Brasier, B. J. Donham, and W. S. Gregory.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, p 50-61, July 1973. 3 fig, 2 tab, 9 ref.

Descriptors: *Water resources development, *New Mexico, *Groundwater resources, *Desalination, *Nuclear energy, Geothermal studies, Methodology, Costs, Economics, Water supply, Water demand, Mineral industry, Recreation facilities, Water utilization, Saline water, Groundwater, Water quality, Chemical analysis.
Identifiers: Tularosa Valley (N Mex).

Like other southwestern states, New Mexico needs more water. The Upper Rio Grande and Pecos basins have smaller water supplies, in relation to projected demand, than any other basin in the United States. A possible water shortage solution based on desalting, ultimately by means of geothermal or nuclear energy, the several hundred million acre-feet of saline groundwater in the Tularosa Valley is described. The resulting recreational-industrial-agricultural complex would ultimately encompass on the order of one million acres. It would provide one million acre-feet of fresh water per year, 2000 megawatts of electric power, valuable magnesium and other minerals separated from the saline water at a rate of several million tons per year, and many associated recreational and social benefits. The name referred to this enterprise during preliminary conceptual studies is the Tularosa-Rio (TRG) Project. (See also W74-02456) (Woodard-USGS)
W74-02461

MULTI-STAGE FLASH EVAPORATOR,
Societa Italiana Resine S.p.A., Milan (Italy). (Assignee).
D. Barba, G. Liuzzo, and G. Tagliaferri.
U. S. Patent No. 3,763,014, 4 p, 4 fig, 11 ref; Official Gazette of the United States Patent Office, Vol 915, No 1, p 267, October 2, 1973.

Descriptors: *Patents, *Water treatment, *Desalination, Sea water, *Flash distillation, Condensers, Evporators, *Water quality.

The evaporator comprises an outer, continuous generally horizontally disposed, longitudinally extending casing and an inverted U-shaped shell which is positioned within and extends along the length of the casing. A plurality of vertical, spaced-apart, transverse partition walls having passages therethrough adjacent the bottom of the shell, subdivide the shell into a plurality of serially connected chambers. Inlets and outlets are provided for the continuous flow through the evaporation chambers of the pre-heated liquid (sea-water) to be evporated. Successively lower internal pressure exist in adjacent chambers. The outer walls of the shell and the inner walls of the casing define a number of separate condensation chambers positioned laterally on each side of the central evaporation zone, the condensation chambers extending along the length of the casing. Two heat exchangers, extending along the length of the casing, are positioned within the condensation chambers to cause condensation of the vapor while partially pre-heating the raw sea water. The flow of the raw sea water through the heat e. changers is in a direction opposite that of the flow of the sea water being evaporated in the evaporation chambers. (Sinha-OEIS)
W74-02490

INTERNALLY INTERCONNECTED MULTI--STAGE DISTILLATION SYSTEM,
Hydro Chemical and Mineral Corp., New York. (assignee).
A. Osdor.
U. S. Patent No. 3,755,088, 10 p, 31 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 913, No 4, p 1237, August 1973.

Descriptors: *Patents, *Distillation, *Condensers, *Desalination, Sea water, Multi-stage, *Flash distillation, Water treatment.

Evaporator and condenser arrangements for multistage systems are formed from continuous tabular columns and transverse plates. In the condensers, elongated partition plates cooperate with segments of the column wall todefine internal liquid passageways between spaced condensers. In the evaporators, the transverse plates are shaped to define wells and trap forming partitions. Arrangements are described for achieving imterspersal of condenser groups with minimum pumping and minimum use of column height. (Sinha-OEIS)
W74-02496

3B. Water Yield Improvement

FLOW ANALYSIS OF HYDRAULIC CONNECTORS IN ARTIFICIAL RECHARGE SYSTEMS, A MODEL STUDY,
Ohio State Univ., Columbus. Water Resources Center.
For primary bibliographic entry see Field 04B.
W74-02219

POWER, FRESH WATER, AND FOOD FROM COLD, DEEP SEA WATER,
Polytechnic Inst. of Brooklyn, N.Y.
D. F. Othmer, and O. A. Roels.
Science, Vol 182, No 4108, p 121-125, October 12, 1973. 7 ref.

Descriptors: *Aquifculture, Resources development, *Power marketing, Water resources, *Sea water, Freshwater, Steam, *Solar radiation, Deep water, Economic feasibility, Steam turbines, Solar stills, Marine algae, Marine animals, Lobster, Shrimp, Shellfish, Profit, *Water yield improvement.
Identifiers: *Mariculture, Deep sea farming.

The solar heat energy accumulating in the vast volumes of warm tropical seas is many times that produced by all existing power plants and could yield huge amounts of fresh water and electric power, as the evaporating warm surface water could generate steam to power a turbine and then freshwater upon condensation of steam by the cold water. A 'mariculture' pilot plant built by Alemco Inc. (Division of Viatech Inc., Syosset, N.Y) in the Caribbean indicates a great potential increase in revenues over that from power and freshwater generation. Deep sea water contains large quantities of nutrients to feed algae and, in turn, shellfish, shrimp, and lobster in shallow ponds. Valuable seaweed can be grown on wastes, and substantial profits can be derived by combined revenues from desalination, power generation, and mariculture. (Brown-IPC)
W74-02254

WEATHER MODIFICATION OPERATIONS IN CALIFORNIA, OCTOBER 1, 1970-SEPTEMBER 30, 1971,
California State Dept. of Water Resources, Sacramento. Div. of Resources Development.
T. A. Johnson, and J. B. Powers.
Available from State of Calif., Documents Section, P.O. Box 20191, Sacramento, Calif. 95820, Price $1.00. Bulletin No 16-71, June 1972. 18 p, 3 plate.

Descriptors: *Weather modification, *Artificial precipitation, *Cloud seeding, *California, Silver iodide, Polyelectrolytes, Surfactants, Fog, Projects, Data collections, Water yield.
Identifiers: Fog dispersion, Airport.

Weather modification operations were conducted in 10 areas of California during the 1970-71 water year by nine licensed operators. Two of these projects were operated to suppress fog: the active agents in one case were polyelectrolytes and surfactants and, in another, urea powder was dispersed. The remaining projects used silver iodide in various forms as the active agent to increase precipitation. Three projects reported in previous years were inoperative during the 1970-71 water year. The Santa Clara County Flood Control and Water District project was inactive for its second season. The Lake Almanor Project of the Pacific Gas and Electric Company, which functioned during the preceding season, was also inactive. Definite plans exist to reactivate both projects in the 1971-72 water year. The Upper Santa Ana River Project of the San Bernardino Valley Municipal Water District was active during the 1970-71 water year but no seeding occurred. Fog suppression experiments were performed at Arcata, California, by the U. S. Naval Weapons Center of China Lake, California, and the U. S. Air Force at McClellan Air Force Base, California. These two activities are described separtely from those performed by licensed operators. (Woodard-USGS)
W74-02293

INTERBASIN TRANSFER OR MIGRATION: AN ECONOMIC ANALYSIS OF TWO RESPONSES TO GROUND WATER DEPLETION,
Kansas Water Resources Research Inst., Manhattan.
For primary bibliographic entry see Field 04B.
W74-02323

A WAY TO MAKE THE DESERT GREEN,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
G. C. A. Morin, D. K. Parsons, W. G. Matlock, and D. D. Fangmeier.
Progressive Agriculture in Arizona, Vol 25, No 4, p 4-8. July-August 1973.

Descriptors: *Water harvesting, Rainfall-runoff relationships, Computer models, *Crop production, Runoff, *Arizona, Demonstration farms,

Arid lands, Soil moisture, Field crops, *Water yield improvement.
Identifiers: *Desert strip farming.

Collection of local rainfall as runoff for use on nearby cropped areas offers an alternative and little used means of meeting a crop's water requirements in arid and semiarid regions where water is the limiting factor. Desert strip farming, using water harvested from a collector area to help supply the moisture requirements of a cultivated crop on a smaller farmed area, is a technique used centuries ago not only in the Middle East but also in Arizona and northern Mexico. Now modern-day researchers are developing computer models to consider various water sources and losses, and soil and crop characteristics to calculate yield. Data for several stations in the Tucson, Arizona area confirm the validity of the model in varying degrees of conclusiveness. Results from field tests indicate that having good soil moisture conditions as crops germinate is an important factor in the production of a successful crop. Regardless of the collector-area to farmed-area ratio, the yield will be highly variable from year to year and crop failures will occur in certain years because of poor rainfall distribution. While useful as a supplementary cource, such a system is not a total substitute for irrigated agriculture. (Paylore-Arizona)
W74-02346

EVOLVING WATER POLICY AND MANAGEMENT IN THE UNITED STATES,
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 06B.
W74-02358

ANOTHER RIO GRANDE FOR NEW MEXICO,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 03A.
W74-02461

PROPOSED WATER-RESOURCES AND LAND--CAPABILITY INVESTIGATION, ARUSHA REGION, TANZANIA,
Geological Survey, Lakewood, Colo.
For primary bibliographic entry see Field 02A.
W74-02627

EVAPOTRANSPIRATION AND WATERSHED RESEARCH AS RELATED TO RIPARIAN AND PHREATOPHYTE MANAGEMENT--AN ABSTRACT BIBLIOGRAPHY.
Forest Service (USDA), Tempe, Ariz. Forest Hydrology Lab.
For primary bibliographic entry see Field 02D.
W74-02630

3C. Use of Water of Impaired Quality

FACTORS AFFECTING THE MANGANESE STATUS IN SOILS OF THE U.A.R.,
Ain Shams Univ., Cairo (Egypt). Dept. of Soils.
For primary bibliographic entry see Field 02G.
W74-02200

THE USE OF DESALTED SEAWATER FOR INTENSIVE AGRICULTURAL APPLICATIONS, (EL USO DE AGUA DE MAR DESALADA PARA INTENSIVAS APLICACIONES AGRICOLAS),
Arizona Univ., Tucson. Environmental Research Lab.
For primary bibliographic entry see Field 03A.
W74-02359

3D. Conservation in Domestic and Municipal Use

URBAN STORM DRAINAGE ACTIVITIES IN NEW YORK,
Soil Conservation Service, Albany, N.Y.
For primary bibliographic entry see Field 04A.
W74-02171

WATER AND SEWERAGE IMPROVEMENTS NEEDED IN 1975 IN CHATHAM COUNTY, GEORGIA.
Chatham County-Savannah Metropolitan Planning Commission, Savannah, Ga.
For primary bibliographic entry see Field 05D.
W74-02186

MUNICIPAL WATER PLANNING--MIXED INTEGER APPROACH,
Utah State Univ., Logan. Dept. of Civil Engineering.
T. C. Hughes, and C. G. Clyde.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY11, Proceedings paper No. 10131, p 2079-2095, November 1973. 2 fig, 9 tab, 14 ref, 3 append.

Descriptors: *Water distribution, *Water supply, *Alternative planning, *Computer programs, Hydraulics, *Municipal water, Optimization, Costs, Estimating, Water demand, Operating costs, Capital, Investment, Streamflow, Resource allocation, Constraints, Seasonal, Equations, Operations research, Mathematical models.
Identifiers: Mixed integer programming, *Cost minimization, Branch Bound concept, Uncertainty, Chance constrained programming.

A typical municipal water supply planning problem is to select a combination of water sources (some with randomly varying yield), physical facilities, and operating rules in order to supply the stochastic demand of several service zones. Each zone probably will have different growth characteristics and each demand will vary seasonally. This type of planning problem requires a finely-scaled model which may have as many decision variables as a multipurpose regional planning problem. Needed is a mathematical programming model capable of handling uncertainty in both supply and demand to optimize the investment in municipal water supply facilities. The mixed integer approach overcomes here many of the limitations of linear programming: it allows separation of capital investment and operating costs for detailed analysis of the least cost of insuring desired level of service. Standards of pipe and equipment require discrete, not continuous, variables. Presented is an optimizing algorithm based on the Branch Bound concept of mixed integer programming which selects the optimum combination of source-facilities from all possible alternatives. A model is developed for an example problem and the optimum solution is given. (Bell-Cornell)
W74-02223

FOURTH ANNUAL REPORT, CITY OF CARBONDALE, ILLINOIS, WATER AND WASTEWATER TREATMENT.
Carbondale Dept. of Public Works, Ill.
For primary bibliographic entry see Field 05D.
W74-02328

CITY OF AUSTIN, TEXAS, STUDY OF WASTEWATER COLLECTION SYSTEM: PHASE I.
Horner and Shifrin, Inc., St. Louis, Mo.
For primary bibliographic entry see Field 05D.
W74-02330

METROPOLITAN WATER AND SEWER PLAN, LUBBOCK METROPOLITAN COUNCIL OF GOVERNMENTS.
Hudgins, Thompson, Ball and Associates, Inc., Lubbock, Tex.

Prepared for Lubbock Metropolitan Council of Governments, Lubbock, Texas, February 1969. 34 p, 2 fig, 10 tab. P-209.

Descriptors: *Planning, *Water supply development, *Sewerage, *Metropolitan studies, Sewage treatment, *Texas, Water resources development, Water resources, Forecasting, *Waste water treatment, Water reuse, Water importing, Imported water, Irrigation.
Identifiers: *Lubbock (Texas).

Guidelines are presented for use in evaluating engineering and planning development programs for water and sanitary sewer facilities for the Lubbock Metropolitan Council of Governments. Water supplies will need to be imported because natural precipitation is deficient. Without supplements to irrigation supplies, acreage under irrigation on the High Plains area is expected to decrease from 2.5 million acres in 1964 to 400,000 acres in 2020. Domestic demand for water is expected to increase from a 1970 level of 30 mgd to 81.4 mgd by the year 2000. Sewage flows are expected to increase from about 20 mgd to 62 mgd over the same period. It is recommended that a technical advisory committee be established to govern development of both water supply and sewerage plans, and that regional cooperation among communities be established. Future water rights must be preserved, and additional rights obtained. Secondary or tertiary wastewater treatment should be developed, and wastewater should be reused for irrigation, groundwater recharge or industrial applications. Industrial wastes should be pretreated to be compatible with the municipal sewage treatment plant. Rural areas should be provided with both water and sewers. Because of the high cost of these projects, estimated to cost over $26 million for water and $12 million for sewerage by 1990, it is recommended that all forms of financial assistance be developed. (Poertner)
W74-02331

REGIONAL WASTEWATER FACILITIES STUDY.
Anderson-Nichols and Co., Inc., Concord, N.H.
For primary bibliographic entry see Field 05D.
W74-02338

NORTHEAST GEORGIA AREA WATER AND SEWER SYSTEMS PLAN AND CAPITAL IMPROVEMENT PROGRAM.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.

Prepared for Northeast Georgia Area Planning and Development Commission, Athens, February 1973. 250 p, 16 fig, 11 tab, 5 append. GPA-GA-04-04-1002.

Descriptors: *Comprehensive planning, *Water supply, *Sewerage, *Regional development, Sewers, Water supply development, Data collections, Financing, *Georgia, Optimum development plans, Financial feasibility, Forecasting.

A comprehensive water and sewer plan was developed for the 10-county Northeast Georgia Area Planning and Development Commission. Located east of the City of Atlanta, this region is generally rural in nature and has had a population decline between 1930 and 1960. However, area population is now increasing, partially due to spinoffs from urban areas. The area includes about 3,000 square miles, and it had a 1970 population of 192,941. The population in the year 2,000 is expected to be about 306,000. Health hazards exist due to a lack of adequate water and sewer facilities. Many residents do not have public water on

sewerage services. Although existing water treatment facilities are maintained in better shape than the sewerage systems, many water systems are marginally operated. Large quantities of water are wasted through leakage. It was recommended that each county establish a county water and sewer authority, and that local water systems be encouraged to join its county authority. Intermim facilities are recommended for those areas where lack of sufficient developments prevents economical connection to the county system. Public education programs to obtain cooperation and connection to the water and sewer systems are recommended, because many residents presently prefer not to join existing systems. Financial and program implementation information is also provided. (Poertner)
W74-02339

WATER QUALITY CHARACTERISTICS OF STORM SEWER DISCHARGES AND COMBINED SEWER OVERFLOWS,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 05B.
W74-02345

A STUDY OF WATER USED ON URBAN LANDSCAPES,
New Mexico State Univ., University Park. Dept. of Horticulture.
For primary bibliographic entry see Field 06B.
W74-02459

GROUND-WATER RECHARGE FOR URBAN USE: LEAKY ACRES PROJECT,
Agricultural Research Service, Fresno, Calif. Ground Water Recharge Field Station.
For primary bibliographic entry see Field 04B.
W74-02468

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR URBAN STUDIES IN THE HOUSTON, TEXAS METROPOLITAN AREA, 1971,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 02E.
W74-02471

3E. Conservation in Industry

OPTIMIZATION OF INDUSTRIAL SYSTEMS WITH THE SEPARABLE PROGRAMMING AND THE GENERALIZED REDUCED GRADIENT METHODS,
Kansas State Univ., Manhattan. Dept. of Industrial Engineering.
For primary bibliographic entry see Field 05G.
W74-02213

MANUFACTURE OF CAPACITOR PAPER -- SOME PROBLEMS WITH FRESH WATER PREPARATION, (ERZEUGUNG VON KONDENSATORPAPIER -- EINIGE PROBLEME BEI DER FRISCHWASSERHERSTELLUNG),
For primary bibliographic entry see Field 05D.
W74-02247

POWER, FRESH WATER, AND FOOD FROM COLD, DEEP SEA WATER,
Polytechnic Inst. of Brooklyn, N.Y.
For primary bibliographic entry see Field 03B.
W74-02254

HYLTE BRUK: NEWSPRINT AND ENVIRONMENTAL PROTECTION, (HYLTE BRUK: ZEITUNGSDRUCKPAPIER AND UMWELTSCHULTZ).
For primary bibliographic entry see Field 05D.
W74-02256

(TAPPI) ENVIRONMENTAL CONFERENCE, MAY 14-16, 1973.
Technical Association of the Pulp and Paper Industry, Atlanta, Ga.
For primary bibliographic entry see Field 05D.
W74-02273

THE CPAR PROGRAM - GOVERNMENT-INDUSTRY COOPERATION IN POLLUTION ABATEMENT RESEARCH,
Department of the Environment, Ottawa (Ontario).
For primary bibliographic entry see Field 05D.
W74-02274

ADVANCED PRACTICAL WATER RECYCLE IN TISSUE MANUFACTURE,
Kimberly-Clark Corp., Neenah, Wis.
For primary bibliographic entry see Field 05D.
W74-02279

ADVANCED TREATMENT OF PURIFIED SEWAGE FOR PRODUCTION OF HIGH--BRIGHTNESS PULP AND PAPER,
South African Pulp and Paper Industries Ltd., Springs. Enstra Mill.
For primary bibliographic entry see Field 05D.
W74-02280

COMPUTER SIMULATION OF STORM WATER RUNOFF,
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 02E.
W74-02310

SURVEY OF METHODS OF TREATING WINE AND GRAPE WASTE WATER,
New York State Dept. of Environmental Conservation, Albany. Environmental Quality Research and Development Unit.
For primary bibliographic entry see Field 05D.
W74-02329

CHARACTERIZATION OF WASTE EFFLUENTS FROM A COMMERCIAL PIMENTO CANNING OPERATION,
Georgia Experiment Station, Experiment.
For primary bibliographic entry see Field 05A.
W74-02379

'CLEAN ENERGY VIA COAL GASIFICATION',
Fluor Corp. Ltd., Los Angeles, Calif.
For primary bibliographic entry see Field 06B.
W74-02462

3F. Conservation in Agriculture

A STUDY OF FACTORS INFLUENCING THE NITROGEN AND PHOSPHORUS CONTENTS OF NEBRASKA WATERS,
Nebraska Univ., Lincoln. Dept. of Agronomy.
For primary bibliographic entry see Field 05B.
W74-02151

MINIMIZING NITRATE SEEPAGE FROM THE HULA VALLEY INTO LAKE KINNERET (SEA OF GALILEE): I. ENHANCEMENT OF NITRATE REDUCTION BY SPRINKLING AND FLOODING,
Technion-Israel Inst. of Tech., Haifa. Soils and Fertilizers Lab.
For primary bibliographic entry see Field 05B.
W74-02153

PLANT NUTRIENT CONCENTRATIONS IN RUNOFF FROM FERTILIZED CULTIVATED EROSION PLOTS AND PRAIRIE IN EASTERN SOUTH DAKOTA,
South Dakota State Univ., Brookings. Dept. of Soils.
For primary bibliographic entry see Field 05B.
W74-02154

TWO ENVIRONMENTAL ANALYSES INVOLVING AGRICULTURE,
Illinois Univ., Urbana.
For primary bibliographic entry see Field 05B.
W74-02166

DEVELOPMENT OF AN 'OPERATIONS' MODEL FOR MONTANA'S WATER RESOURCES: MIDDLE CREEK RESERVOIR OPERATION,
Montana State Univ., Bozeman. Water Resources Research Center.
For primary bibliographic entry see Field 04A.
W74-02214

FINANCING PRIVATE WATER RESOURCE DEVELOPMENT: ANALYSIS OF A STATE LOAN PROGRAM,
Wyoming Univ., Laramie. Div. of Agricultural Economics.
T. L. Dobbs, C. E. Olson, W. G. Wedemeyer, and G. H. Pfeiffer.
Available from the National Technical Information Service as PB-226 112, $2.75 in paper copy, $1.45 in microfiche. Research Report, 1972. 18 p, 4 fig, 2 tab, 10 ref. OWRR A-001-WYO (58), OWRR A-002-WYO (4).

Descriptors: *Water resources development, *Financing, *Loans, *State governments, *Wyoming, Sprinkler irrigation, Interest, Investment, Crops, Return (Monetary), Economic impact.

A marked decline in large scale Federally financed irrigation projects in such western states as Wyoming has led to investigation of alternative means of financing such projects through existing financial institutions and private investment. An economic analysis of the Wyoming State low-interest water development loan program for financing center-pivot sprinkler systems and groundwater development is presented. A feasibility analysis alternative means of financing the investments illustrates that the loan program was more attractive to investors than other alternatives and has stimulated the conversion of land from dry pasture and cropland to irrigated forage production. Whereas the state program accounts for the profitability of some forage production plans, sprinkler investments in sugar beets and potatoes are shown as highly profitable even under conventional financing. Simulation analysis indicates a significantly positive impact of sprinkler systems used for cash crops on economic viability of farm firms while those used for forage had less positive and sometimes a negative impact. Because a proportion of sprinkler investments were not dependent on the loan program the precise effects of sprinkler investments on regional development are difficult to ascertain although they are known to be positive. (Weaver-Wisconsin)
W74-02221

GRASSHOPPERS AND CRICKETS IN THE KARSHI STEPPE, (IN RUSSIAN),
Akademiya Nauk Uzbekskoi SSR, Tashkent. Institut Zoologii i Parazitologii.
R. A. Alimdzhanov, and N. Ergashev.
Uzb Biol Zh. Vol 16, No 2, p 43-45. 1972.
Identifiers: *Alfalfa, Bothriophlax-Semenovi, Conocephalus-Fuscuc, *Cotton, *Crickets, Decticus-Albifrons, *Grasshoppers, Gryllodinus-Kerlensis, Gryllotalpa spp, Gryllus spp, Oecanthus-Turanicus, Platycleis-Intermedia, Pteronemobius spp, Semenoviana-Pltaicovi,

Steppes, Tetigonia-Viridissima, *USSR (Karshi steppe).

The 5 spp. of grasshoppers found in this area in the USSR, Tettigonia viridissima L., Decticus albifrons F., Platycleis intermedia Serv., Sememoviana pltnicovi Uv., and Conocephalus fuscus F., are potentially harmful insects to many field cultures, especially cotton and alfalfa. Three species of Grillidae, Gryllus desertus Pall., G. bimaculatus Deg., and G. burdigalensis Latr. are the most abundant crickets. Also widely distributed are G. pallipalpis (Tarb.), G. chivensis (Tarb.) Gryllodinus kerkennensis Fin., Pteronemobius heideni concolor Walk., P. gracilis Jak., and Bothriophlax semenovi (Mir.). The stalk cricket Oecanthus turanicus Uv. attacks technical cultures. The 2 mole crickets, Gryllotalpa unispina Sauss. and G. gryllotalpa L. live in moist areas. Cultivation and irrigation of the Karshi steppe, USSR, has promoted the increase of crickets, especially of the Gryllus L. and Gryllotalpa L. genera.--Copyright 1973, Biological Abstracts, Inc.
W74-02239

ANHYDROUS AMMONIA FOR FIELD CROPS: AN EVALUATION OF ANHYDROUS AMMONIA AS A NITROGEN SUPPLY FOR COTTON, CORN, RICE AND WHEAT,
M. T. Eid.
General Organization for Agricultural Crops Equilization Fund: Cairo, Egypt. 1972. 257 p. Illus.
Identifiers: *Ammonia (Anhydrous), Books, Corn, Cotton, *Fertilizers, *Field crops, Nitrogen, Nutrition, Rice, Soil Wheat, Hydrogen ion concentration, Egypt.

The feasibility of the use of anhydrous ammonia as a N supply for cotton, corn, rice and wheat in Egypt is discussed. Factors affecting changes of ammonium hydroxide applied to a clay loam soil, changes in soil pH as a result of ammonia application, N absorption by wheat and corn crops when supplied by ammonium nitrate and anhydrous ammonia injected in irrigation water are examined. Field experiments to evaluate anhydrous ammonia as a N fertilizer included in irrigation water, or applied directly to the soil, are described.--Copyright 1973, Biological Abstracts, Inc.
W74-02240

THE ACTION OF ABSCISIC ACID ON ION UPTAKE AND WATER FLOW IN PLANT ROOTS,
Sydney Univ. (Australia). School of Biological Sciences.
W. J. Cram, and M. G. IPitman.
Aust J Biol Sci. Vol 25, No 6, p 1125-1132. 1972, Illus.
Identifiers: *Abscisic acid, *Barley, *Ion uptake (Plants) *Maize, *Roots, Water flow.

Abscisic acid (ABA) inhibited transport of K+ and Cl- from the cut ends of excised barley and maize roots. Transport to the shoot of intact barley seedlings was also inhibited. Total uptake into the excised root of barley did not appear to be affected by ABA. There was an increase in tracer accumulated in the root accompanying the reduction in transport from the cut end. Concentrations of ABA above 10-6 M produced the maximum effect. Measurements of exudation from excised maize roots showed that ABA inhibited both water flow and net K transport into the exudate. The reduction in water flow was completely accounted for as an osmotic consequence of inhibition of K secretion, so that there was no evidence for an effect of ABA on the permeability of the root to water. The results are discussed in relation to the regulation of ion and water distribution within the whole plant.--Copyright 1973, Biological Abstracts, Inc.
W74-02260

DRY ACTIVATED SLUDGE AS FERTILIZER FOR WINTER WHEAT AND CORN, (SUKHOI AKTIVNYI IL KAK UDOBRENIE DLYA POSEVOV OZIMI PSHENITS' I KUKURUZ'),
For primary bibliographic entry see Field 05D.
W74-02270

SYSTEMS ANALYSIS OF IRRIGATION WATER MANAGEMENT IN EASTERN IDAHO,
Idaho Univ., Moscow. Water Resources Research Inst.
For primary bibliographic entry see Field 04B.
W74-02322

EFFECT OF EXCESS SOIL MOISTURE ON YIELD AND BIOCHEMICAL PROCESSES IN SPRING WHEAT AT VARIOUS STAGES OF ITS DEVELOPMENT (IN RUSSIAN),
Moscow State Univ. (USSR).
E. V. Ganyushina, and V. M. Lazarchik.
Vestn Mosk Univ Ser 6 Biol Pochvoved, Vol 26, No 5, p 118-120, 1971.
Identifiers: Biochemical processes, *Soil moisture, *Wheat yield, USSR.

Krasnozernaya spring wheat was least resistant to excess soil moisture at the 3-leaf stage and most resistant in the tillering stage.--Copyright 1973, Biological Abstracts, Inc.
W74-02325

A WAY TO MAKE THE DESERT GREEN,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
For primary bibliographic entry see Field 03B.
W74-02346

TRICKLE IRRIGATION ON COTTON,
Agricultural Research Service, Phoenix, Ariz. Water Conservation Lab.
D. A. Bucks, L. J. Erie, and O. F. French.
Progressive Agriculture in Arizona, Vol 25, No 4, p 13-16. July-August 1973, 1 fig, 3 tab, 6 ref.

Descriptors: *Irrigation systems, *Cotton, *Crop response, *Irrigation effects, *Arizona, Experimental farms, Furrow irrigation, Water requirements, Monitoring, Rates of application.
Identifiers: *Trickle irrigation.

The objective of this field investigation on cotton was to evaluate the effects of limiting quantities and varying frequencies of trickle irrigation for maximum crop production. Cotton was chosen because it is a crop which is an excellent indicator of moisture stress. One year's data was gathered and analyzed from the University of Arizona's Cotton Research Center in Phoenix, on a relatively fine-textured clay loam soil with a previous field history of barley for one year and cotton for three years previous to barley. Total fertilizer applied during the previous year and before planting was 420 lb/acre of urea, none thereafter. Criteria for trickle irrigation consisted of applying three quantitites, based on ratios of the plant's consumptive-use estimate, at three frequencies. These nine treatment combinations were replicated four times in a split-plot design. Results suggest that the amount of soil moisture needed by the cotton plant for high production with trickle irrigation is approximately equal to the present consumptive-use estmate for furrow irrigation, and that increased frequency of trickle irrigation may not necessarily increase yields on fine-textured soil. (Paylore-Arizona)
W74-02347

GUIDE TO IMPROVEMENT OF ARIZONA RANGELAND.
Arizona Interagency Range Technical Sub-Committee, Tucson.
For primary bibliographic entry see Field 04A.
W74-02349

THE BALANCE OF SURFACE WATER RESOURCES IN THE LOWER MESOPOTAMIAN VALLEY,
Research Inst. for Water Resources Development, Budapest (Hungary).
For primary bibliographic entry see Field 06B.
W74-02350

USE OF SYSTEMS APPROACHES IN PLANNING ISRAEL'S WATER RESOURCES MANAGEMENT,
Tahal Consulting Engineers Ltd. (Tel Aviv, Israel).
For primary bibliographic entry see Field 06A.
W74-02352

AGROCLIMATIC AREAS FOR WHEAT AND BIOCLIMATIC CHARACTERISTICS OF ITS CULTIVARS IN URUGUAY, (IN SPANISH),
Buenos Aires Univ. (Argentina). Faculted de Agronomia y Veterinaria.
J. J. Burgos, and W. C. Corsi.
Minist Ganad Agric Cent Invest Agric 'Alberto Boerger' Bol Tec. 12 p, 1-32. 1971. Illus. (English summary).
Identifiers: *Agro (Climates), *Bioclimates, Cultivars, Humidity, Photoperiod, Temperature, *Uruguay, *Wheat, Climatic data.

With the meteorological data available in Uruguay, the country was divided in areas according to the world wheat agroclimatic types. The country has 3 different areas with the common characteristic of photoperiod of short duration and lack of cold water. The northern part of the country is very humid during heading whereas the rest is humid. The temperature during ripening is warm in the northwest portion of the country and mild in the rest. The validity of the world wheat agroclimatic types in Uruguay was proved. The cultivars studied in the bioclimatic trials in the period 1965-1968 showed that the best adapted to the agroclimatic conditions of Uruguay were the early ripening cultivars of groups I and II and the late ripening cultivars of group II.--Copyright 1973, Biological Abstracts, Inc.
W74-02354

DETERMINATION OF TRACE FLUORINE IN BIOLOGICAL MATERIALS BY PHOTONUCLEAR ACTIVATION ANALYSIS,
National Inst. of Radiological Sciences, Chiba (Japan).
For primary bibliographic entry see Field 05A.
W74-02361

DISSIPATION AND PHYTOTOXICITY OF DICAMBA RESIDUES IN WATER,
Texas A and M Univ., College Station. Dept. of Range Science.
For primary bibliographic entry see Field 05B.
W74-02370

EVALUATION OF THE REGIONAL MULTIPURPOSE ECONOMIC BENEFITS RESULTING FROM A WATER AND RELATED LAND RESOURCE DEVELOPMENT,
Idaho Univ., Moscow. Water Resources Research Inst.
For primary bibliographic entry see Field 06B.
W74-02439

LEGAL AND INSTITUTIONAL CONSTRAINTS IN CONSOLIDATING IRRIGATION SYSTEMS,
Colorado State Univ., Fort Collins. Dept. of Economics.
G. E. Radosevich.
In: Optimization of Irrigation and Drainage Systems Proceedings, Irrigation and Drainage Specialty Conference, October 6-8, 1971, Lincoln, Nebraska, American Society of Civil Engineers, New York (1971), p 349-372. OWRR B-043-COLO (8).

Descriptors: *Irrigation systems, *Irrigation, *Water law, *Consolidation, Irrigation practices, Irrigation programs, Administrative decisions, Common law, Constitutional law, Judicial decisions, Legislation, Riparian rights, Water policy, Public rights, Arizona, Colorado, Nevada, Utah, Wyoming.

Legal doctrines and organizational arrangements relative to irrigation systems development, water supply and demand pressures and the role they play in irrigation systems consolidation are examined. The study is primarily concerned with the multitude of irrigation companies within a system and their complex interaction in distributing and applying water. The legal development of the right to use water is reviewed. The important point in the water rights picture is that mere possession of a water right may not guarantee any water to the right holder. Consolidation of irrigation companies, however, would bring together water rights of different priorities. The relevant substantive, administrative and procedural law of a number of states is examined. Conclusions are that the physical properties of the consolidation problem present no real threat and that the identified legal constraints are not impregnable. (Reed-Florida)
W74-02533

THE EFFECT OF SOIL MOISTURE UPON THE AVAILABILITY OF POTASSIUM AND ITS INFLUENCE ON THE GROWTH OF YOUNG MAIZE PLANTS (ZEA MAYS L.),
Landwirtschaftliche Forschungsanstalt, Buentehof (West Germany).
K. Mengel, and C. Von Braunschweig.
Soil Sci. Vol 114, No 2, p 142-148. 1972. Illus.
Identifiers: Diffusion, *Maize growth, Nutrients, *Pottassium, *Soil moisture, Zea-Mays.

The effect of soil moisture on the availability of K and its influence on plant growth was studied with young corn plants. The experiments were carried out with a split root technique in which the plants had to take up the K from a soil medium; the other nutrients and water were provided by a nutrient solution. Different water tensions in the soil were maintained. The experiment consisted of 4 pF water holding index treatments and 5 K treatments. The highest yields and the largest quantities of K taken up by the corn shoots were obtained at pF 2. With increasing water tensions (pF 2.4 and 2.7) the yields and the quantities of K uptake declined sharply. The yield level of the various pF treatments increased with an increase of the exchangeable K of the soil. A linear highly significant relationship was obtained between the K diffusion rates and the total K uptake of the plants. The yield depressions, effected by higher water tensions in the soil were due to a reduced K-availability caused by a restricted K diffusion. The diffusion rates depended mainly on the soil moisture and the K level of the soil respectively. Higher K applications counterbalanced the negative influence of higher pF values on the K diffusion to some extent. There was a highly significant linear correlation between the K content of the shoots and the yield.--Copyright 1973, Biological Abstracts, Inc.
W74-02554

PROPOSED WATER-RESOURCES AND LAND--CAPABILITY INVESTIGATION, ARUSHA REGION, TANZANIA,
Geological Survey, Lakewood, Colo.
For primary bibliographic entry see Field 02A.
W74-02627

WATER RECYCLING OF SEWAGE EFFLUENT BY IRRIGATION: A FIELD STUDY ON OAHU,
Hawaii Univ., Honolulu. Water Resources Research Center.
For primary bibliographic entry see Field 02B.
W74-02631

04. WATER QUANTITY MANAGEMENT AND CONTROL

4A. Control of Water on the Surface

URBAN STORM DRAINAGE ACTIVITIES IN NEW YORK,
Soil Conservation Service, Albany, N.Y.
R. J. McClimans, and R. S. Jonas.
Paper No. 73-208 presented at 1973 Annual Meeting, American Society of Agricultural Engineers, University of Kentucky, Lexington, June 17-20, 1973.

Descriptors: *Urban drainage, Storm runoff, New York, Cities, *Storm drains, *Floods, Urbanization, Urban hydrology.
Identifiers: *New York City.

Urban flooding problems can be solved. Plans must be developed for adequate storm drainage in expanding suburbs. The objective should be to preserve streams and flood plains in as near their natural state as possible while allowing for compatible functional usage. (SCS)
W74-02171

A SUMMARY ANALYSIS OF NINETEEN TESTS OF PROPOSED EVALUATION PROCEDURES ON SELECTED WATER AND LAND RESOURCE PROJECTS.
Water Resources Council, Washington, D.C.
For primary bibliographic entry see Field 06B.
W74-02188

APPLICABILITY OF THE INTERCEPTOR WATERWAY CONCEPT TO THE ROOKERY BAY SANCTUARY,
Tropical Bioindustries Development Co., South Miami, Fla.
E. J. Heald, and D. C. Tabe.
Available from the National Technical Information Service as PB-226 115, $2.75 in paper copy, $1.45 in microfiche. Rookery Bay Land Use Studies, Environmental Planning Strategies for the Development of a Mangrove Shoreline, Study No. 6. The Conservation Fundation, Washington, D.C. November 1973. 13 p, 3 fig. OWRR C-4022 (No. 9004) (1)., C-1817 (No. 3170) (1), and C-2201 (No. 3385) (1).

Descriptors: Bays, *Florida, *Land use, Nutrients, Environmental control, Marshes, *Waterways.
Identifiers: *Rookery Bay sanctuary (Fla), *Interceptor waterways.

The possibilities of stringent land use controls in the wetland regions surrounding the Rookery Bay Sanctuary probably reduce the neceesity for, and the applicability of, an Interceptor Waterway as a water management tool. However, the Waterway, intelligently located, can still perform a useful function as a spreader and redistributor of upland runoff into seaward marshes. The grographic area between Naples Bay and McIlvane Bay, west of U.S. 41, is discussed as a water management unit, and possible locations of interceptor waterways are suggested. Consideration is given to the possible environmental impact of nutrient-rich runoff waters on marsh areas if urban development and agricultural interests choose to rely heavily on marshes as biological filters.
W74-02205

INPUT SPECIFICATIONS TO STOCHASTIC DECISION MODELS,
Arizona Univ., Tucson. Dept. of Systems Engineering.
For primary bibliographic entry see Field 02E.
W74-02209

DEVELOPMENT OF AN 'OPERATIONS' MODEL FOR MONTANA'S WATER RESOURCES: MIDDLE CREEK RESERVOIR OPERATION,
Montana State Univ., Bozeman. Water Resources Research Center.
T. T. Williams, and G. V. V. Rao.
Available from the National Technical Information Service as PB-226 119, $3.50 in paper copy, $1.45 in microfiche. Report No. 44, September 1973. 23 p, 6 fig, 4 ref, 6 append. OWRR A-056-MONT (1).

Descriptors: *Reservoir operation, *Water management (Applied), *Mathematical models, Water supply, Irrigation water, Flood control, Snow surveys, Computer models, Linear programming, Dynamic programming, *Montana, Optimization, *Reservoir releases.
Identifiers: *Hyalite reservoir (Mont).

Operational problems at Hyalite Reservoir, Montana were investigated in a one-year pilot study. Hyalite is a single-purpose (irrigation) reservoir which is normally filled from snow runoff in April, May and June, and normally depleted in July, August and September. Flooding on Hyalite Creek is not normally a serious problem. However, some flood control benefits could be realized by utilizing snow survey data obtained by the U.S. Soil Conservation Service. In years of high winter precipitation, spring filling should be delayed so as to insure storage availability at the time of runoff peak. Linear programming and dynamic programming procedures were presented to demonstrate the feasibility of optimizing reservoir releases over a four-season period. As applied to Hyalite Reservoir, the techniques are of limited use, because spring inflows are almost always adequate to completely fill the reservoir. The techniques will be valuable when applied to a larger basin such as the Musselshell, which is under further investigation.
W74-02214

FLOODPLAIN MAPPING AND PLANNING FOR THE 50 AND 100 YEAR INTERVAL FLOOD ZONES OF THE BITTERROOT VALLEY, MONTANA,
Montana Univ., Missoula.
N. K. Michael.
Available from the National Technical Information Service as PB-226 083, $4.25 in paper copy, $1.45 in microfiche. Montana University Joint Water Resources Research Center, Bozeman, Report No. 43, October 1973. 46 p, 9 fig, 32 plates, 5 tab, 13 ref, 4 append. OWRR A-064-MONT (1).

Descriptors: *Flood plain zoning, *Frequency analysis, *Photogrammetry, *Mapping, Flood plains, River basin development, *Montana, Hydrograph analysis, Planning.
Identifiers: Flood plain storage, Flood plain mapping, *Bitterroot River (Mont).

Flood hazard maps, delineating 50-year and 100-year flood plain areas, were prepared for an 80-mile reach of the Bitterroot River in Western Montana. Discharge rates corresponding to 50-year and 100-year recurrence frequency were obtained for six stations on the river using graphical methods suggested by the U.S. Geological Survey. River stage was monitored at 15 locations in the reach for a 14-day period during the June 1972 snowmelt runoff season to develop simulated rating curves. The rating curves were extended to encompass 50 and 100 year frequencies by plotting the data on semi-logarithmic paper and visually fitting the points to a straight line. Aerial photographs of the reach were taken on June 1, 1972 when the river was in flood stage but before the snowmelt peak had occurred. The photographs were used in conjunction with the ground control sites to establish flood boundaries corresponding to 50 and 100-year floods. The flood hazard maps thus produced cost an average of $51 per river mile, as compared to $400-1,000 per river mile reported by Wolman

(U.S. Geological Survey, 1972). Although less accurate, the maps developed in this study are believed adequate for most flood plain planning needs. (Williams-Montana)
W74-02215

MUNICIPAL WATER PLANNING--MIXED INTEGER APPROACH,
Utah State Univ., Logan. Dept. of Civil Engineering.
For primary bibliographic entry see Field 03D.
W74-02223

MAPPING AVERAGE ANNUAL SURFACE WATER RESOURCES OF THE HYDROLOGICAL REGIONS OF NELSON, NEW ZEALAND,
Ministry of Works, Nelson (New Zealand). Water and Soil Div.
For primary bibliographic entry see Field 02E.
W74-02290

FLOOD CONTROL FUNDS -- 1970 REPORT TO THE LEGISLATURE.
California State Dept. of Water Resources, Sacramento.
For primary bibliographic entry see Field 06C.
W74-02292

RIVER REGIMES IN IRAN,
Durham Univ. (England). Dept. of Geography.
For primary bibliographic entry see Field 02E.
W74-02298

ELEVATION DEPENDENT MODEL FOR ESTIMATING ANNUAL RUNOFF,
Wyoming Univ., Laramie. Water Resources Research Inst.
For primary bibliographic entry see Field 02A.
W74-02317

STUDIES ON SEEPAGE FROM CANALS WITH PARTIAL LINING,
Indian Inst. of Tech., Kanpur. Dept. of Civil Engineering.
K. Subramanya, M. R. Madhav, and G. C. Mishra.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10197, p 2333-2351, December 1973. 11 fig, 6 ref, append.

Descriptors: *Canal linings, *Canal seepage, Water loss, *Seepage, Leakage, Flow nets, Permeability, Porous media.

Seepage from partially lined trapezoidal canals in a homogeneous isotropic porous medium of large depth was studied using inversion of hodographs and the Schwarz-Christoffel transformation. The two cases studied are: (1) seepage from canals whose sides are lined but bottom unlined; and (2) seepage from canals whose bottom is lined but sides unlined. For every side slope of the canal there is a particular aspect ratio at which lining the sides or bottom results in the same reduction of seepage. For canals having an aspect ratio more than this, bottom lining is more effective and for a lesser aspect ratio, side lining will be more effective. For a canal having an aspect ratio of 9 and a side slope of 2.5:1, a 50% reduction in seepage is ensured by sealing the bottom. (Knapp-USGS)
W74-02319

TOMBIGBEE RIVER VALLEY WATER MANAGEMENT DISTRICT, TENTH ANNUAL REPORT.
Tombigbee River Valley Water Management District, Tupelo, Miss.
For primary bibliographic entry see Field 06B.
W74-02332

GUIDE TO IMPROVEMENT OF ARIZONA RANGELAND.
Arizona Interagency Range Technical Sub-Committee, Tucson.

Bulletin A-58, University of Arizona, Cooperative Extension Service and Agricultural Experiment Station, October 1973. 93 p, 3 tab, 9 maps, 26 photos.

Descriptors: *Range management, *Land classification, *Arizona, *Brush control, Arid lands, Deserts, Mesquite, Range grasses, Brushlands, Forage grasses, Grama grasses, Wheat grasses, Grazing, Grasslands, Land management, *Land use, Environmental control, Planting management, Fertilization.

The publication is intended as a guide in the planning and application of proper range use, brush control, range seeding, and range fertilization practices on Arizona rangeland. The major land resource areas and environmental zones of Arizona are delineated and described in accordance with the national classification of the U.S. Department of Agriculture, Soil Conservation Service, in terms of vegetation, topography, soils, elevation, and climate. Proper range use is discussed in terms of grazing extent and forage production. Methods of evaluating proper range use are presented. Brush control practices are presented as mechanical and chemical alternatives. A table is presented with 16 major undesirable shrubs of Arizona and suggested treatments, with time of treatment and informative remarks concerning each. Range seeding practices are presented as lists and descriptions of preparatory and actual seeding procedures. Twenty-seven beneficial forage species recommended for Arizona are described, and environmental and planting conditions explained. For each of the zones, forage species are recommended by elevation and precipitation constraints. A short section is included on range fertilization recommendations for the Arizona environmental zones. An appendix tabulates common and scientific names of species. (Muller-Arizona)
W74-02349

EVOLVING WATER POLICY AND MANAGEMENT IN THE UNITED STATES,
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 06B.
W74-02358

EVALUATION OF THE REGIONAL MULTIPURPOSE ECONOMIC BENEFITS RESULTING FROM A WATER AND RELATED LAND RESOURCE DEVELOPMENT,
Idaho Univ., Moscow. Water Resources Research Inst.
For primary bibliographic entry see Field 06B.
W74-02439

DEVELOPMENT OF MODELS FOR ANALYZING WATER RESOURCES DEVELOPMENT AND USE WITHIN A REGIONAL FRAMEWORK,
Iowa State Univ., Ames.
For primary bibliographic entry see Field 06A.
W74-02455

FLOOD OF JUNE 1972 AT CORNING, NEW YORK,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07C.
W74-02479

HYDROLOGY AND WATER RESOURCES OF THE NEPONSET AND WEYMOUTH RIVER BASINS, MASSACHUSETTS,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07C.
W74-02480

WETLAND FILL-RESTRICTIONS DO NOT CONSTITUTE A COMPENSABLE 'TAKING' WITHIN THE MEANING OF THE FIFTH AMENDMENT,
C. Biunno.
Seton Hall Law Review Vol 4, p 662-282, 1973. 102 ref.

Descriptors: *Land use, *Public rights, *Wetlands, *Wisconsin, Constitutional law, Zoning, Permits, Environmental effects, Landfills, Drainage, Dredging, Natural use, Real property, Eminent domain, Legal aspects.
Identifiers: Shoreland zoning, Police powers.

The subject case (Just v Marinette County, 50 Wis. 2d 7, 201 N.W. 2d 761 (1972)) marks the first time a court has balanced the restrictions on an individual landowner which are implicit in land-use controls against harm to the environment that adversely affects the rights of the public. The county, acting pursuant to a statute granting counties authority for shoreland zoning, required a property owner to secure a conditional use permit for the filling, drainage, or dredging of wetlands. The Supreme Court of Wisconsin held that because of the special characteristics of the wetlands it was not an unreasonable exercise of the police power to prevent harm to public rights by limiting the use of private property to its natural uses. Cases dealing with the fifth amendment requirement of just compensation for the taking of land by the government are reviewed. By confronting the scope of the property owner's right to use his property as he wishes, the court in this case provided a viable and valuable rationale for courts in states where legislation has recently been enacted to protect coastal wetlands and where challenges regarding reasonableness of such regulations will presumably arise. The decision in the case gives the courts an 'environmental' theory to use in deciding when or whether a state should compensate owners for property losses inflicted by environmental land use regulation. (Sears-Florida)
W74-02503

OGUNQUIT SAND DUNE LAND STABILIZATION MEASURE, YORK COUNTY IN MAINE, THRESHOLD TO MAINE RESOURCE CONSERVATION AND DEVELOPMENT PROJECT (FINAL ENVIRONMENTAL STATEMENT).
Soil Conservation Service, Orono, Maine

Available from the National Technical Information Service as EIS-ME-73-0704 F, $4.00 in paper copy, $1.45 in microfiche. March 1973. 32 p, 1 map, 1 tab, 3 append.

Descriptors: *Maine, *Land management, *Land use, *Land development, *Erosion control, Vegetation establishment, Sand dunes, Sedimentation, Rivers, Sewage treatment, Wildlife habitats, Estuary, Environmental effects.
Identifiers: *York County (Me.), *Environmental Impact Statements, Coastal waters.

A proposed project in York County, Maine if for land stabilization consisting of restoring and stabilizing a twenty eight acre barrier dune through the placement of sand, plantings of vegetation and the installation of erosion and pedistrian control measures. The measure will reduce erosion on the Ogunquit Dune and Beach and also reduce sedimentation into the Ogunquit River, the Rachel Carson Wildlife Refuge, and the Ogunquit Village Sewer District Sanitary Sewage Treatment Plant. Increased stormwave protection will be provided to the sewage treatment plant and some mainland homes. Habitat will be restored and enhanced for a wide variety of shore birds and other wildlife. The shellfishery in the estuary will be maintained and enhanced. Increased employment and business expansion will result directly from project action. Restricted access to twenty eight acres of the dune and complete coverage of parts of the present dune by sand placement are the major effects of the measure. Loosended material will be trans-

ported to the river mouth during construction. Increased traffic, dust, noise, and road maintenance will result from vehicles involved in construction. (Sears-Florida)
W74-02504

SALMON FALLS DIVISION, UPPER SNAKE RIVER PROJECT, IDAHO, PART 11.
For primary bibliographic entry see Field 06E.
W74-02515

RIVER BASIN MONETARY AUTHORIZATIONS--DISASTER RELIEF ACT AMENDMENTS.
For primary bibliographic entry see Field 06E.
W74-02516

FLOOD CONTROL PROJECT MAINTENANCE AND REPAIR--1970 INSPECTION REPORT,
California State Dept. of Water Resources, Sacramento.
For primary bibliographic entry see Field 02E.
W74-02617

WATER RESOURCES OF THE SKOKOMISH INDIAN RESERVATION, WASHINGTON,
Geological Survey, Tacoma, Wash.
For primary bibliographic entry see Field 02G.
W74-02623

4B. Groundwater Management

AGRICULTURAL CHEMICALS IN SURFACE RUNOFF, GROUND WATER, AND SOIL: 1. ENDRIN,
Agricultural Research Service, Baton Rouge, La.
For primary bibliographic entry see Field 05B.
W74-02152

DETERMINATION OF THE MECHANICAL COMPATIBILITY OF POROUS ROCKS WITH WASTE WATER IN ITS SUBSURFACE DISPOSAL,
Ustredni Ustav Geologicky, Brno (Czechoslavakia).
For primary bibliographic entry see Field 05B.
W74-02165

GROUND WATER SEEPAGE PATTERNS TO WELLS FOR UNCONFINED FLOW--PHASE II,
Iowa State Water Resources Research Inst., Ames.
For primary bibliographic entry see Field 02F.
W74-02206

FLOW ANALYSIS OF HYDRAULIC CONNECTORS IN ARTIFICIAL RECHARGE SYSTEMS, A MODEL STUDY,
Ohio State Univ., Columbus. Water Resources Center.
W. A. Pettyjohn.
Available from the National Technical Information Service as PB-226 069, $4.50 in paper copy, $1.45 in microfiche. Project Completion Report No. 336X, July 1973. 119 p, 56 fig, 7 tab, 22 ref. OWRR A-015-OHIO (1). 14-01-0001-1855.

Descriptors: *Artificial recharge, Hydraulics, *Groundwater movement, *Groundwater recharge, Injection wells, Pit recharge, *Hydrologic models, History, Water management (Applied), *North Dakota, Model studies, Recharge wells, Infiltration, Permeability.
Identifiers: *Hydraulic connectors.

Artificial recharge techniques have long been used to augment groundwater supplies and increase the yield of infiltration galleries. A case history of the water-supply situation at Minot, North Dakota, which has long suffered from severe water shortages, indicates the usefulness of artificial recharge. Throughout much of the Minot aquifer, the water level was raised more than 20 feet within six months of artificial recharge operation. The cost of the system (about $193,000) was minute in comparison to an estimates cost of $12 million for a pipeline to the Missouri River. A model study of the movement of a wetting front beneath an artificial recharge site, under both dry and damp conditions, illustrates the profound effect of permeability and stratification on the shape of the front. A model study dealing with the shape of the cone of recharge in the vicinity of a recharge well shows that there is a sharp change in gradient directly under the well. Elsewhere the cone develops a shape that is generally consistent with theoretical studies. Where the cone of recharge crosses a boundary, indicating a change in permeability, the cone is slightly distorted.
W74-02219

FINANCING PRIVATE WATER RESOURCE DEVELOPMENT: ANALYSIS OF A STATE LOAN PROGRAM,
Wyoming Univ., Laramie. Div. of Agricultural Economics.
For primary bibliographic entry see Field 03F.
W74-02221

GEOLOGIC CONTROL OF GROUND WATER MOVEMENT IN A PORTION OF THE DELAWARE PIEDMONT,
Delaware Univ., Newark. Dept. of Geology.
For primary bibliographic entry see Field 02F.
W74-02320

SYSTEMS ANALYSIS OF IRRIGATION WATER MANAGEMENT IN EASTERN IDAHO,
Idaho Univ., Moscow. Water Resources Research Inst.
C. E. Brockway, J. de Sonneville, J. A. Bondurant, and R. U. Worstell.
Available from the National Technical Information Service as PB-226 100, $6.25 in paper copy, $1.45 in microfiche. Completion Report, October 1973. 74 p, 32 fig, 2 tab, 9 ref. OWRR B-018-IDA (1). 14-01-001-3577.

Descriptors: *Groundwater, *Water management (Applied), Surface-Groundwater relationships, Water level fluctuations, Alluvial aquifers, Digital computers, Model studies, *Irrigation water, *Idaho, *Systems analysis, Regional analysis, Alternative water use, Seepage, Diversion, Water table.
Identifiers: *Snake River Fan (Idaho), Groundwater hydrology, Geohydrologic parameter calibration.

A water management study on a 96,000 acre irrigated tract in eastern Idaho was performed to develop techniques for regional water management studies and investigate alternatives for alleviating a high water table problem in the area. A complete water budget including irrigation diversions, system losses and wastes and crop and property damage was determined. A finite difference digital aquifer boundary includes an automated calibration routine to adjust aquifer parameters to fit historical water table elevations. This routine is especially useful on aquifers with limited hydrogeological data. Results indicate that canal seepage and above average irrigation application rates are the main causes of the rise of up to 40 feet in water tables during the irrigation season. Alleviation of the problem could be achieved with a 20% greater reduction in irrigation diversions or by lining of selected reaches of canals.
W74-02322

INTERBASIN TRANSFER OR MIGRATION: AN ECONOMIC ANALYSIS OF TWO RESPONSES TO GROUND WATER DEPLETION,
Kansas Water Resources Research Inst., Manhattan.
R. W. Ruppert, and G. S. Clausen.
Available from the National Technical Information Service as PB-226 066, $3.00 in paper copy, $1.45 in microfiche. Contribution No. 125, 1973. 31 p, 6 ref. OWRR A-039-KAN (1). 14-31-0001-3516.

Descriptors: *Inter-basin transfers, *Model studies, *Withdrawal, Economics, *Groundwater mining, *Kansas, *Migration, Benefits, Irrigation.

An area which depends upon ground water mining for a substantial proportion of its income faces three alternatives as its groundwater becomes depleted: (1) it can develop more water through alternative sources of supply as improved natural recharge, importation and artificial recharge, and waste water reuse; (2) it can transfer water use to less consumptive, higher-yield applications such as high-yield crops or manufacturing processes; (3) it can incur reductions in income and in population because of migration. An economic model which can be used to compare, from society's point of view, the first alternative and the third as responses to ground water depletion was studied. Should an area depleting its groundwater be encouraged to develop interbasin transfer of water or should it be encouraged to promote migration. In order to fully assess the nature of the costs of constructing or of abandoning facilities such as public buildings and roads and private factories or farm houses, a model of just the area would not be adequate. In order to study society's point of view it is necessary to imbed the model of the area within a model that takes into account the economic consequences of migration on the receiving area. Several conceptual models are developed that include migration, interbasin transfer, and ground water depletion. Some of the theoretical implications of the models are interpreted as they relate to the formulation of ground water resource pricing schemes. Some of the implications of the research findings for local ground water management districts are discussed. The research methods being employed to develop projections of water requirements for the state of Kansas are called into question.
W74-02323

A GUIDE TO IMPORTANT CHARACTERISTICS AND VALUES OF FRESHWATER WETLANDS IN THE NORTHEAST.
Massachusetts Univ., Amherst. Dept. of Forestry and Wildlife Management.

Available from the National Technical Information Service as PB-226 075, $3.50 in paper copy, $1.45 in microfiche. Publication No. 31, Massachusetts Water Resources Research Center, Amherst, July 1973. 35 p, 2 maps. (editor, J.S. Larson). OWRR B-012-MASS (5). 14-31-0001-3090.

Descriptors: *Wetlands, *Groundwater potential, *Aesthetics, *Wildlife, *Flood control, Economics, Northeast U.S., *Massachusetts, Value.

Identification and review was conducted of specific characteristics of freshwater wetlands which determine their value for groundwater supply, aesthetics, wildlife, flood control and groundwater economics. Appendices include references to surficial geology and groundwater in Massachusetts, a map (1:500,000) of freshwater wetlands in Massachusetts and a map (1:500,000) of the surficial geology of Massachusetts, with specific reference to potential groundwater aquifers.
W74-02324

WATER RESOURCES OF LEE COUNTY, MISSISSIPPI,
Geological Survey, Washington, D.C.
B. E. Wasson, and F. H. Thomson.
Water-Supply Paper 1899-B, Washington, D.C., 1970. 63 p, 19 fig, 9 tab, 26 ref.

Descriptors: *Water resources, *Data collections, *Mississippi, *Groundwater, Water supply, *Water quality, Water resources development, Planning, Water tables, Water management (Applied).
Identifiers: Lee County (Mississippi), Tupelo (Mississippi).

The water resources of Lee County (in northeastern Mississippi) were investigated in a 2-year study by the U. S. Geological Survey. All sources of water were appraised to provide a base of information to local water users and water utilities. Special attention was given to the quality of ground water in the Tupelo area. In this area, municipal and industrial water use has been the greatest and water levels have declined the most, approximately 3 to 5 feet annually. The 1960 population of the County was 40,589, of which 17,221 lived in Tupelo. Tupelo is largely industrialized, while the rest of the County is agricultural land or forested. Yearly temperatures range from about 12F to 100F, with an average temperature of about 63 degrees. Annual precipitation is about 53 inches. Water supplies are adequate to meet foreseeable needs. In the Tupelo area, water demand in 1967 from two aquifers was about 7 mgd and withdrawal could be doubled for sustained yield. Runoff management is also a feasible means of supplying needed water as runoff exceeds 1,000 acre-feet per square mile per year. Artificial recharge of aquifers with surface runoff appears to offer limited possibilities. (Poertner)
W74-02340

USE OF SYSTEMS APPROACHES IN PLANNING ISRAEL'S WATER RESOURCES MANAGEMENT,
Tahal Consulting Engineers Ltd. (Tel Aviv, Israel).
For primary bibliographic entry see Field 06A.
W74-02352

GROUNDWATER EXPLORATION AND PROVISION FROM THE HYDROGEOLOGICAL POINT OF VIEW,
Bundesanstalt fuer Bodenforschung, Hanover (West Germany).
G. Luettig.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 25 p, 51 ref.

Descriptors: Groundwater, *Groundwater availability, Subsurface waters, Aquifer characteristics, *Aquifers, Groundwater recharge, *Groundwater resources, Hydrogeology, Saline water intrusion, Water storage, Water table aquifers, Surface-groundwater relationships, Arid climates, *Arid lands, Waste water disposal, Water pollution sources, Data collections, *Water quality.

The German Federal Geologic Survey has maintained advisory groups 19 arid countries throughout the world, as well as having conducted extensive hydrogeologic work in West Germany itself. Groundwater resources planning in Germany includes setting aside aquifers for future water development. In such regions, forestry and recreation are given priority over activities of greater water demand. The Survey also considers the impact of new procedures dealing with groundwater, such as solid and fluid waste disposal in aquifers, underground storage of oil and other bulk goods, salt water intrusion, disposal of radioactive wastes, and similar activities. From their overseas activities, dealing principally with the assessment and evaluation of groundwater resources in such arid regions as Iran, Jordan, Mauretania, Niger, Saudi Arabia, and in Latin America in Peru and Argentina, the German Survey recommends worldwide research in the inventorying of groundwater reserves and their quality, with a view of making that knowledge more widely known for necessary intelligent and far-seeing water resources development planning. (Muller-Arizona)
W74-02353

WATER QUALITY MANAGEMENT IN GROUNDWATER BASINS,
Arizona Univ., Tucson. Dept. of Hydrology and Water Resources.
For primary bibliographic entry see Field 05B.
W74-02356

USE OF DIGITAL COMPUTER TECHNIQUES IN WATER RESOURCES DATA STORAGE,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
W. G. Matlock.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 19 p, 1 tab, 8 ref.

Descriptors: *Data collections, *Data storage and retrieval, *Hydrologic data, Information retrieval, *Well data, Computer programs, Computers, Documentation, *Arizona, Arid lands, Groundwater resources.

Data resulting from groundwater resources research in parts of Southern Arizona conducted since 1906 have been placed on punched cards and/or magnetic tape for storage, retrieval, and analysis. Included are well information such as annual water level measurements, yield, specific capacity, water quality and well location. Computer programs to print out the data in forms for various uses were developed. A software package was prepared for making contour maps of groundwater levels, water level changes, and other hydrologic variables. Applications of digital computer techniques in data analysis include: determination of the effect of data density on contouring accuracy, modeling groundwater recharge from an ephemeral stream channel, determination of aquifer specific yield and recharge, a finite difference groundwater basin model, and a model of runoff farming systems. Advantages of the digital computer data reduction and analysis system include savings in both time and money, reduced live storage space and fewer errors. Data are much more available to non-project personnel and other agencies. More detailed analysies, including statistical techniques, are now possible. (Muller-Arizona)
W74-02357

THE ROLE OF DEFORMATION IN CHANGING THE RESERVOIR PROPERTIES OF AQUIFERS,
Montana Univ., Missoula. Dept. of Geology.
For primary bibliographic entry see Field 02F.
W74-02446

WATER RESOURCES DEVELOPMENT IN THE MULLICA RIVER BASIN,
College of South Jersey, Camden. Dept. of Zoology.
For primary bibliographic entry see Field 05C.
W74-02450

A CONJUNCTIVE USE SURFACE WATER--GROUND WATER SIMULATOR,
New Mexico Inst. of Mining and Technology, Socorro. Dept. of Geoscience.
For primary bibliographic entry see Field 02F.
W74-02452

DISPERSION OF SUBSTANCES FROM WELL RECHARGE OPERATIONS IN AN ANISOTROPIC, HOMOGENEOUS CONFINED AQUIFER,
Wisconsin Univ., Madison. Dept. of Civil and Environmental Engineering.
For primary bibliographic entry see Field 02F.
W74-02454

EVALUATION OF NITRATE CONTENT OF GROUND WATER IN HALL COUNTY, NEBRASKA,
Illinois State Environmental Protection Agency, Springfield. Div. of Land Pollution Control.
For primary bibliographic entry see Field 05B.
W74-02465

UNSTEADY DRAWDOWN AT A PARTIALLY PENETRATING WELL IN A TRANSVERSELY ISOTROPIC ARTESIAN AQUIFER,
University Coll. of Engineering, Hyderabad (India). Dept. of Civil Engineering.
D. B. Rao, G. M. Karadi, and R. J. Krizek.
Ground Water, Vol 11, No 6, p 44-49, November-December 1973. 3 fig, 5 ref.

Descriptors: *Drawdown, *Aquifer characteristics, *Artesian aquifers, *Anisotropy, Unsteady flow, Seepage, Aquifer testing, Computer programs, Equations, Permeability.

The effect of aquifer anisotropy on the unsteady drawdown at the face of a partially penetrating well which is pumped at a constant rate was studied analytically. The aquifer is confined between two parallel aquicludes, and its hydraulic conductivity is assumed to be transversely isotropic. Based on a parametric study of the drawdown equation, it is concluded that the variation in drawdown depends on which of the principal permeabilities is held constant, as well as the ratio between them. For constant radial permeability, the rate of increase of drawdown with time is independent of the permeability ratio; furthermore, unless the well penetration is very small, aquifer anisotropy is of little consequence for permeability ratios close to unity. For constant vertical permeability, well penetration has practically no influence on the drawdown for lower permeability ratios. The effect of aquifer anisotropy increases from a negligible value for a fully penetrating well to a maximum for wells which just tap the aquifer. (Knapp-USGS)
W74-02466

GROUND-WATER RECHARGE FOR URBAN USE: LEAKY ACRES PROJECT,
Agricultural Research Service, Fresno, Calif. Ground Water Recharge Field Station.
H. I. Nightingale, and W. C. Bianchi.
Ground Water, Vol 11, No 6, p 36-43, November-December 1973. 7 fig, 4 tab, 11 ref.

Descriptors: *Artificial recharge, *California, *Recharge ponds, Irrigation water, Infiltration, Water management (Applied), Alluvium, Municipal water.
Identifiers: San Joaquin Valley (Calif), Fresno (Calif).

Problems associated with the use of agricultural surface water for artificial groundwater recharge to maintain an urban groundwater supply are studied at the Leaky Acres Recharge Project in Fresno, California. Groundwater recharge and agricultural technologies are combined to recharge available irrigation water through agricultural soils of known chemical, geologic, and hydrologic properties. Leaky Acres has 47.4 ha of ponding surface in 10 basins. During 1971 and 1972 recharge seasons not all ow the area was in operation at one time; a total of 17,150,000 cu m of high quality water was recharged. The 1972 average intake rate was 17.5 cm per day. Changes in groundwater

quality related to soil leaching during recharge should result in eventual improvement of the regional groundwater quality. (Knapp-USGS)
W74-02468

SHALLOW GROUND WATER IN THE ZAMIN DAWAR AREA, HELMAND PROVINCE, AFGHANISTAN,
Geological Survey, Washington, D.C.
N. E. McClymonds.
Open-file report, January 1972. 103 p, 21 fig, 14 tab, 7 ref.

Descriptors: *Groundwater resources, *Water wells, *Water yield, *Hydrogeology, *Foreign research, Water utilization, Withdrawal, Water table, Aquifer characteristics, Hydrologic cycle, Streamflow, Surface-groundwater relationships, Precipitation (Atmospheric), Water quality, Hydrologic data, Rainfall-runoff relationships, Water resources development.
Identifiers: *Helmand Province (Afhanistan).

Groundwater conditions are evaluated in the Zamin Dawar area which lies between Kajakai Reservoir and Musa Qala Rud (river) in south-central Afghanistan, about 90 km northeast of Lashkar Gah. The area comprises two mainstream drainage areas: that of Gulmesh Mandeh (ephemeral stream) to the east which includes mostly plains with low hills on the east and north slopes and a high limestone scarp on the west slope; and Baghni Rud to the west which drains a mountainous area to the north and spreads onto a large alluvial fan with distributaries leading both to Helmand Rud to the southeast and Musa Qala Rud to the west. During the investigation in 1971, data showed that the karezes yield a total of about 20,000 ac-ft of water per year. The springs on the plains yield about 3,000 ac-ft and the wells about 300 ac-ft per year. The inventoried springs in Baghni valley yield about 6,500 ac-ft per year, and supply about 70% of the total water used in the valley. The total amount of water used in the Zamin Dawar area in 1971 was about 32,000 ac-ft (40 million cu m). This amount of water was used to irrigate about 10,000 jiribs (approximately 5,000 acres or 2,000 hectares) of cultivated land and served a population of about 40,000 people. (Woodard-USGS)
W74-02472

SELECTED REFERENCES, GROUND-WATER CONTAMINATION, THE UNITED STATES OF AMERICA AND PUERTO RICO.
Geological Survey, Washington, D.C. Water Resources Div.
For primary bibliographic entry see Field 05B.
W74-02482

HYGIENIC CONDITIONS IN THE PROCUREMENT OF DRINKING WATER FROM INDIVIDUAL SOURCES (IN GERMAN),
For primary bibliographic entry see Field 05B.
W74-02547

WATER-RESOURCES APPRAISAL OF FISH LAKE VALLEY, NEVADA AND CALIFORNIA,
Geological Survey, Carson City, Nev.
For primary bibliographic entry see Field 02A.
W74-02616

WATER RESOURCES OF THE BIG SIOUX RIVER VALLEY NEAR SIOUX FALLS, SOUTH DAKOTA,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 02E.
W74-02619

GROUNDWATER RESOURCES OF VAL VERDE COUNTY, TEXAS,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 02F.
W74-02620

HYDROGEOLOGIC ASPECTS OF A PROPOSED SANITARY LANDFILL NEAR OLD TAMPA BAY, FLORIDA,
Geological Survey, Tallahassee, Fla.
For primary bibliographic entry see Field 05E.
W74-02628

4C. Effects on Water of Man's Non-Water Activities

AN ECOLOGICAL EVALUATION OF STREAM EUTROPHICATION,
Michigan State Univ., East Lansing. Inst. of Water Research.
For primary bibliographic entry see Field 05C.
W74-02201

THE RELATIONSHIPS BETWEEN LAND USE AND EROSION IN THE CENTRAL NORTH ISLAND, NEW ZEALAND,
Waikato Univ., Hamilton (New Zealand). Dept. of Earth Sciences.
For primary bibliographic entry see Field 04D.
W74-02287

EFFECTS OF HIGHWAY BRIDGE CONSTRUCTION ON A SUBARCTIC STREAM,
L. A. Peterson, and D. Nyquist.
The Northern Engineer, Vol 4, No 2, p 18-20, Winter 1972. 2 fig, 1 tab, 10 ref. OWRR B-017-ALAS (5).

Descriptors: *Environmental effects, *Water quality, *Ecosystems, *Bridge construction, *Alaska, Streambeds, Baseline studies, Correlation analysis, Chemical analysis, Aquatic animals, Aquatic plants, Data collections, Evaluation, Water quality control.
Identifiers: *Goldstream Creek (Alaska).

Effects of construction of roads and highways along and over flowing waters and the subsequent reduction in water quality and disturbance of the associated flora and fauna have been the focal point of much heated debate in the United States. The effects of construction of a highway bridge over Goldstream Creek in central Alaska are discussed. Goldstream Creek in the past has been subjected to extreme environmental damage, both aquatic and terrestrial, due to past gold dredging and placer mining operations. The stream has been rerouted to facilitate the mining operations. The terrestrial vegetation has never recovered; however, the aquatic exosystem seems to have fared better. Young grayling were observed in Goldstream Creek in 1971. Presently, Goldstream Creek does not contain a viable sports fishery. The changes in water quality and bottom organisms between August 1970 and October 1971 are described. (Woodard-USGS)
W74-02295

PRESCRIBED FIRE EFFECTS ON WATER REPELLENCY, INFILTRATION AND RETENTION IN MIXED-CONIFER LITTER, DUFF AND SOIL,
California Univ., Berkeley. School of Forestry and Conservation.
H. H. Biswell, and J. K. Agee.
Available from the National Technical Information Service as PB-226 225 $2.75 in paper copy, $0.45 in microfiche. University of California Water Resources Center Completion Report, Nov. 1973, 5 p. OWRR A-044-CAL and B-151-CAL (2).

Descriptors: *Forest Management, *Erosion Control, *Forest fires, *Sediment control, *Water yield improvement, Forest soils, Water conservation, Watershed management, *California.

Prescribed fires were applied to ponderosa pine-incense-cedar and white fir-giant sequoia ecosystems in the southern Sierra Nevada. Aerial and heavy fuels were not affected, but weight, depth, and water-holding capacity of fine fuels were reduced. Forest floor wettability was altered, and some water repellency was transferred to the soil. Soil physical properties were slightly affected: one index of soil water repellency, the capillary rise index, increased. Another index, the water drop penetration time, was not increased. Bulk density was not affected, and even though per cent carbon slightly decreased, the grams per square meter of carbon was not affected. Water runoff, and to a lesser degree sediment yield, were increased by burning. The increases were most highly correlated to the decrease in the forest floor. A computer model using depth of forest floor as an index of runoff and erosion hazard was developed and showed that prescribed fires could be used in ecosystem management without generating erosion hazards of significance. Professional wildlife managers can use the results to simplify the measurement of fire intensity and fuel loading, and to meet the objectives of burning programs while minimizing erosion hazards. (Snyder-California)
W74-02442

MICROBIAL AND CHEMICAL STUDIES IN A WATERSHED USED FOR MUNICIPAL SUPPLY AND WASTE DISPOSAL,
Montana State Univ., Bozeman. Dept. of Microbiology.
For primary bibliographic entry see Field 05C.
W74-02449

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR URBAN STUDIES IN THE HOUSTON, TEXAS METROPOLITAN AREA, 1971,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 02E.
W74-02471

4D. Watershed Protection

CALIBRATING A WATER YIELD MODEL FOR SMALL UNGAGED WATERSHEDS,
Kentucky Dept. of Natural Resources, Frankfort. Div. of Water.
For primary bibliographic entry see Field 02A.
W74-02172

HURRICANE AGNES FLOODS EAST MAHANTANGO CREEK,
Agricultural Research Service, University Park, Pa. Northeast Watershed Research Center.
For primary bibliographic entry see Field 02E.
W74-02174

THE EX POST MEASUREMENT OF BENEFITS AND COSTS IN SMALL WATERSHED PROJECTS,
Georgia Univ., Athens. Inst. of Natural Resources.
For primary bibliographic entry see Field 06B.
W74-02212

HYDROLOGIC AND WATERSHED MODELING FOR WATERSHED PLANNING,
Soil Conservation Service, Portland, Oreg.
D. E. Woodward.
Transactions of the ASAE, (American Society of Agricultural Engineers), Vol 16, No 3, p 582-584, 1973. 8 ref.

Descriptors: Water resources, *Planning, Hydrology, *Conservation, *Computer programs, *Simulation analysis, *Watersheds (Basins), Constraints, *Optimum development plans, Runoff, Reservoir storage, Structures, Earth dams, Hydrographs, *Mathematical models, Systems analysis.
Identifiers: Peak flow.

For the optimum development of land and water resources, future use of hydrologic simulation models as evaluation tools is a necessity. With the advent of high speed computers, more-highly sophisticated modeling is possible, i.e., the ability to consider greater detail in the standard procedures and a greater number of parameters in solving hydrologic problems. The Soil Conservation Service (SCS) has formulated hydrologic and watershed models for the planning and design of conservation measures. These models and the role various organizations have played int their development are described. The basin simulation model developed under contract with the Desert Research Institute in Reno, capable of simulating the major elements of the annual hydrologic cycle, is discussed in detail. Described also are: the SCS computer model developed to evaluate the effects of proposed structural measures on peak flow; and the SCS structure site analysis (computer) program, developed to proportion earth dams and determine the required quantities for a wide range of conditions (using reservoir storage-discharge data to route inflow hydrographs through a potential reservoir and to proportion the structure according to SCS criteria). (Bell-Cornell)
W74-02224

HYDROLOGIC SIMULATION MODEL OF COLORADO SUBALPINE FOREST,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 07B.
W74-02248

THE RELATIONSHIPS BETWEEN LAND USE AND EROSION IN THE CENTRAL NORTH ISLAND, NEW ZEALAND,
Waikato Univ., Hamilton (New Zealand). Dept. of Earth Sciences.
M. J. Selby.
Journal of Hydrology (New Zealand), Vol 11, No 2, p 73-87, 1972. 1 fig, 1 tab, 26 ref.

Descriptors: *Erosion, *Land use, *Erosion control, Grazing, Runoff, Gullies, Gully erosion.
Identifiers: *New Zealand (North Island).

Yellow-brown pumice soils cover a large area of the central North Island of New Zealand. Since land development started in the mid 1930s approximately 4000 sq km have been converted from the native vegetation to exotic forests and pasture. Since about 1959 gully erosion has become more common and widespread. Surface-water runoff is greater from developed land in pasture and less from areas covered by scrub and ungrazed grass vegetation. The major causes of runoff from pastures are very intense rainfall on a soil with low moisture content. Modifications of soil properties, especially compaction caused by animals and vehicles, decrease infiltration and hence promote runoff. Soil particles are easily entrained by running water, but plant roots inhibit this process. Analysis of data from the three experiments indicates that land development should be carried out so that: (a) a close vegetation cover is kept on all soils; (b) channel development is avoided; (c) vulnerable areas such as valley floors and steep valley sides are kept as water absorption areas; (d) animals and vehicles are excluded from water absorption areas to prevent soil compaction; (e) plants with strong and dense root systems are used to protect surface soils. (Knapp-USGS)
W74-02287

THE IMPORTANCE OF SEDIMENT TRANSPORT IN WATER RESOURCES PLANNING,
Arizona Univ., Tucson.
S. Ince.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 12 p.

Descriptors: *Sedimentation, *Geomorphology, *Sediment transport, *Planning, Water supply development, Sediment control, Sediment distribution, Sediment load, Silting, Sediment yield, Geology, Erosion, Running Waters, Drainage, Environment, Projects, Engineering structures.

Erosion, transportation and deposition of sediments is a natural state of the earth's surface. Human interference into this cycle causes discontinuities, and sets into motion a new chain of events sometimes with surprising rapidity and with unexpected geomorphological and economic consequences. The reason for this may at times be lack of precise knowledge, but more often than not it is due to the narrow objectives set for the construction of engineering works. Thus a design aimed at only reducing flood damage, may have geomorphologically and economically harmful effects upstream and downstream. If, however, the planning is on a broad scale and geomorphology is considered as an intregral part of any water resources development scheme, it is possible to foresee and take into account the geomorphological changes that could result, assess their environmental and economical consequences, the suggest measures to prevent a drastic change in geomorphology. The judicious planning of water resource systems aimed at maintaining and improving the geomorphology will require not only greater emphasis on the sediment transport problem, but will result in a broader concept of economic analysis. (Muller-Arizona)
W74-02351

EVALUATION OF SOIL MOISTURE REGIME IN A WATERSHED,
New Brunswick Univ., Fredericton.
For primary bibliographic entry see Field 02G.
W74-02355

PRESCRIBED FIRE EFFECTS ON WATER REPELLENCY, INFILTRATION AND RETENTION IN MIXED-CONIFER LITTER, DUFF AND SOIL,
California Univ., Berkeley. School of Forestry and Conservation.
For primary bibliographic entry see Field 4C.
W74-02442

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR LITTLE ELM CREEK, TRINITY RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
For primary bibliographic entry see Field 02E.
W74-02477

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR CALAVERAS AND ESCONDIDO CREEKS, SAN ANTONIO RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
For primary bibliographic entry see Field 02E.
W74-02478

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR GREEN CREEK, BRAZOS RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
B. B. Hampton.
Open-file report (Texas District), August 1973. 30 p, 2 fig, 3 tab.

Descriptors: *Erosion control, *Flood protection, *Retaining walls, *Hydrologic data, *Texas, Small watersheds, Rainfall-runoff relationships, Basic data collections, Rain gages, Streamflow, Gaging stations, Flow rates, Water yield, Sediment control, Soil conservation, Storm runoff, Watershed management.
Identifiers: *Brazos River basin (Tex), Green Creek (Tex).

The U.S. Soil Conservation Service is actively engaged in the installation of flood- and soil-erosion reducing measures in Texas. Hydrologic investigations of small watersheds were begun by the U.S. Geological Survey in 1951 and are now being made in 12 study areas. This report contains the rainfall, runoff, and storage data collected during the 1971 water year for the 46.1-square-mile area above the stream-gaging station Green Creek near Alexander. There are eight floodwater-retarding structures in the Green Creek study area with a total combined capacity of 7,500 acre-feet below the flood-spillway crests, and they control 22.3 square miles, or approximately 50% of the drainage area above the stream-gaging station. The weighted-mean rainfall over the area during the 1971 water year was 19.97 inches, or 63% of the 1931-60 long-term mean annual rainfall of 31.67 inches. The yearly mean discharge at the stream-gaging station Green Creek near Alexander was 1.13 cfs, compared with the 13-year (1959-71) average of 6.03 cfs. The annual runoff was 818 acre-feet. One storm period (May 28, 1971) was selected for detailed analysis and computation. These computations include a detailed time breakdown of rainfall and discharge. (Woodard-USGS)
W74-02626

05. WATER QUALITY MANAGEMENT AND PROTECTION

5A. Identification of Pollutants

DETECTION OF POLLUTANTS IN WATER BY RAMAN SPECTROSCOPY,
Brown, Boveri und Cie, A.G., Heidelberg (West Germany).
G. Braunlich, G. Gamer, and M. S. Petty.
Water Research, Vol 7, No 11, p 1643-1647, November 1973. 2 fig, 8 ref.

Descriptors: *Pollutant identification, *Spectroscopy, *Fluorescence, Water pollution, Analytical techniques.
Identifiers: *Raman spectroscopy.

The possibility of monitoring pollutants in water by means of Raman spectroscopy is discussed with special reference to the CH-stretching vibration bands of possible impurities. From theoretical considerations the limits of detection were found to be in the range of 1 to 10 ppm. The perturbations due to fluorescence and turbidity in samples were investigated and methods for reducing their effects are discussed. (Knapp-USGS)
W74-02164

QUICK-TIME INSTRUMENTAL MEASUREMENTS OF WASTEWATER ORGANIC CHARACTERISTICS,
Connecticut Univ., Storrs. Dept. of Civil Engineering.
T. Helfgott, and F. L. Hart.
Paper presented at the London Workshop of the International Association on Water Pollution Research on 'Instrumentation, Control and Automation for Wastewater Treatment Systems,', September 17-21, 1973. 16 p, 1 fig, 2 tab, 10 ref.

Descriptors: Instrumentation, *Statistical models, *Measurements, Organic wastes, Waste water (Pollution), *Biochemical oxygen demand, Ammonia, Nitrates, Regression analysis, Treatment

facilities, Domestic wastes, Pollutant identification.
Identifiers: Quick-time, Real-time, *Total oxygen demand, *Total organic carbon, *Total nitrogen.

A rationale for replacing the Biochemical Oxygen Demand either 5-day, ultimate or ultimate carbonaceous by quick-time (real-time) measures of organic pollution is presented. Quick-time measures of organic pollution include Total Oxygen Demand, Total Organic Carbon, Total Nitrogen and ion selective probes for measuring ammonia and nitrates. Four statistical models are presented to illustrate the interrelations that can be made with quick-time measurements. Correlation coefficients for the various regression analyses are presented for the four statistical models. Pitfalls in using correlations include misinterpretation (e.g., BOD cannot measure persistence) and statistical artifact (e.g., using unrelated microbial populations for BOD data). It is suggested that the quick (real-time) measure of pollution replace BOD in the operation of wastewater treatment plants.
W74-02170

SURFACE QUALITY ASSESSMENT OF NATURAL BODIES OF WATER,
Calspan Corp., Buffalo, N.Y.
R. E. Baier.
Proc. 13th Conf. Great Lakes Research, 1970; p 114-127. 7 fig, 36 ref.

Descriptors: Lakes, Oil, Water pollution sources, *Pollutant identification, *New York, *Spectroscopy, Bubbles, *Oil pollution, Instrumentation, Air-water interfaces, Films.
Identifiers: *Lake Chautauqua (N.Y.), *Buffalo River (N.Y.).

Multiple attenuated internal reflection (MAIR) spectroscopy is sensitive to surface films as thin as monolayers transferred from air/water interfaces. Repetitive surface samples have been obtained from natural bodies of water by a simple dip technique with variations in Langmuir-Biodgett transfer mechanics used to favor single film or multilayer deposition. During the 1969 recreational season on Lake Chautauqua, the method demonstrated such phenomena as weekend 'bursts' of hydrocarbon surface pollutants associated with peak recreational activity, rapid natural 'cleansing' of the Lake surface, recognition of proteinaceous substances as major components of bubbles marking wind streaks in the Lake, and of billowing foam accumulated along the windward shore. Application of the method to the Buffalo River demonstrated trapping of surface oil in the upper river segments, with only minor outflow of oily surface pollutants into Lake Erie.
W74-02181

ORGANIC FILMS ON NATURAL WATERS: THEIR RETRIEVAL, IDENTIFICATION, AND MODES OF ELIMINATION,
Calspan Corp., Buffalo, N.Y.
R. E. Baier.
Journal of Geophysical Research, Vol 77, No 27, p 5062-5075, Sept. 1972. 5 fig, 16 ref.

Descriptors: *Films, *Pollutant identification, Air-water interfaces, Bubbles, *Spectroscopy, *New York, *Oily water, Separation techniques, Water pollution control.
Identifiers: *Bubble-Film-Stripping Mechanism, Organic films, *Lake Chautauqua (N.Y.).

Air-water interfacial films were sampled and subjected to nondestructive analysis by multiply attenuated internal reflection (MAIR) infrared spectroscopy. A field program on Lake Chautauqua in western New York correlated the buildup of oily films over the lake surface with peak boating activity and demonstrated the rapid elimination of such pollutant layers by natural mechanisms. A laboratory program to assess the relative efficiencies of various processes for film degradation included studies of the influence of ultraviolet-visible irradiation, capillary-wave action, bacterial activity, and bubble breaking. Bubble breaking and its concomitant ejection of film fragments into the air was by far the most efficient process, especially when simultaneous irradiation accelerated the formation of polar moieties in the films. Chemical fractionation by this mechanism has also been demonstrated, with the more polar organic components and their associated inorganic elements being stripped from the interface preferentially. Thus, air-sea interfacial films are implicated in sea-to-air material transport and in the chemistry of marine aerosols.
W74-02182

CHEMISTRY OF MARINE NATURAL PRODUCTS,
Hawaii Univ., Honolulu. Dept. of Chemistry.
For primary bibliographic entry see Field 05B.
W74-02189

STRONTIUM, CALCIUM AND THE ISOTOPIC COMPOSITION OF STRONTIUM IN UNDERGROUND WATERS FROM THE SCIOTO RIVER BASIN, OHIO,
Miami Univ., Oxford, Ohio. Dept. of Geology.
For primary bibliographic entry see Field 02F.
W74-02218

USING THE ADSORPTION METHOD ON ACTIVATED CHARCOAL WITH CHLOROFORM EXTRACTION (CCE) FOR EVALUATING WATER POLLUTION BY ORGANIC SUBSTANCES, (IN RUSSIAN),
Permskii Politekhnicheskii Institut (USSR). Dept. of Sanitary Technology.
For primary bibliographic entry see Field 05B.
W74-02232

REDUCTION OF BOD AND PHOSPHATE BY CHEMICAL PRECIPITATION. UTILISATION OF SLUDGE,
Uhde (Friedrich) G.m.b.H., Dortmund (West Germany).
For primary bibliographic entry see Field 05D.
W74-02267

CONCENTRATION OF ENTEROVIRUSES FROM LARGE VOLUMES OF WATER,
Baylor Coll. of Medicine, Houston, Tex. Dept. of Virology and Epidemiology.
For primary bibliographic entry see Field 05F.
W74-02271

MEASURING STRESS IN FISH EXPOSED TO PULP MILL EFFLUENTS,
British Colombia Research Council, Vancouver.
For primary bibliographic entry see Field 05C.
W74-02276

A TECHNIQUE FOR EVALUATING ALGAL GROWTH POTENTIAL IN ILLINOIS SURFACE WATERS,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 05C.
W74-02342

USE OF SEPHADEX GEL FOR THE FRACTIONATION OF ORGANIC MATTER IN LAKE WATER, (IN RUSSIAN),
Akademiya Nauk Estonskoi SSR, Tartu. Inst. of Zoology and Botany.
A. Lindpere, and K. Simm.
Eesti Nsv Tead Akad Toim Biol. Vol 21, No 3, p 242-249. 1972. Illus.
Identifiers: *Fractionation, Lakes, *Organic matter, *Sephadex gel filtration, Weight, *Separation techniques, Elution profiles.

Sephadex gel filtration was used for the fractionation of organic color in the different types of lake water. All water samples were collected in winter, concentrated by freezing at -3C, and fractionated on Sephadex G-25 with distilled water as an eluant. Color absorption measurements were made at 225 m micro. In each case the organic substances were separated into 3 peaks, differing in molecular size. The elution profiles of organic matter for the same types of lake water were similar, and they contained the same components. The elution profiles for the water of different lake types were different. The organic matter of dystrophic lakes contained larger quantities of compounds of large molecular weight than those of oligotrophic and eutrophic lakes.--Copyright 1973, Biological Abstracts, Inc.
W74-02343

SEPARATION AND IDENTIFICATION OF METAL DITHIZONATES BY THIN-LAYER CHROMATOGRAPHY AND ITS APPLICATION IN TOXICOLOGICAL ANALYSIS,
Chemical Examiner's Lab., Agra (India). Toxicology Div.
S. N. Tewari, and N. Bhatt.
Mikrochimica Acta, No 3, p 337-340, 1973. 1 tab, 6 ref.

Descriptors: *Separation techniques, *Pollutant identification, *Heavy metals, Methodology, Solvent extractions, Chemical analysis, Toxins, Lead, Copper, Mercury, Cadmium, Zinc, Manganese, Nickel, Cobalt.
Identifiers: *Thin layer chromatography, Biological materials, *Organic solvents, *Metal dithizonates, Complexation, Toxicology, Metal complexes, Biological samples, Toluene, Xylene, Benzene, Carbon tetrachloride, Chloroform.

A quick and reliable method has been developed for the detection of toxic metals present in autopsy tissues and other biological materials, by complex formation and thin-layer chromatography. The study was restricted to the metal ions which form complexes with dithizone and are extractable at (1) pH 1-4 (i.e. Cu, Hg, Cd) and (2) pH 6-8 (i.e. Pb, Zn, Mn, Ni, Co). The thin-layer chromatographic investigation was carried out on Silica Gel-G plates. Autopsy tissues suspected of containing Cu were treated with a chloroform solution of dithizone with the pH of the medium being maintained between 1 and 4. Four developing agents were tested: carbon tetrachloride: chloroform (10:4), toluene, xylene, and benzene. No spray reagents were required as the spots of the metal complexes on the plates were colored. The R sub f values of the common metal complexes in the 4 solvents and the color of their respective spots on the TLC plates are given. (Holoman-Battelle)
W74-02360

DETERMINATION OF TRACE FLUORINE IN BIOLOGICAL MATERIALS BY PHOTONUCLEAR ACTIVATION ANALYSIS,
National Inst. of Radiological Sciences, Chiba (Japan).
S. Ohno, M. Suzuki, M. Kadota, and M. Yatazawa.
Mikrochimica Acta, No 1, p 61-68, 1973. 3 fig, 3 tab, 16 ref.

Descriptors: *Fluorine, *Soil analysis, *Rice, Separation techniques, Water analysis, Air, Vegetable crops, Radioactivity techniques.
Identifiers: Sample preparation, *Photonuclear activation analysis, *Spinach, Chemical interference, Precision, Recovery, Detection limits, Biological samples.

Spinach leaves and rice were prepared for photonuclear activation analysis of fluorine by freeze drying, pulverizing, evaporating with NaOH, fusing the residue with sodium peroxide, dissolving the fused cake in distilled water, centrifuging, and adjusting the supernatant to pH 6-7.

Powdered soil was prepared by fusing with sodium peroxide and following the procedures used for the plant samples. Sample solutions were then passed through an ion exchange resin (Dowex 1X8 and 50WX8) which was dried and sealed in a polyethylene bag for irradiation. Fluorine-18 was separated by adding a fluorine carrier solution and HCl to the sample, filtering, transferring the filtrate to a separation funnel and extracting with dimethyldichlorosilane in xylene. Activity was then measured on a TMC 100-channel pulse height analyzer and the results compared with those from standard solutions. Recoveries ranged from 85 to 91 percent, the detection limit was about 0.01 microgram, and precision was about plus or minus 11 percent. The extraction procedure apparently eliminated interference from iodine, bromine, and chlorine. The method is applicable to air, water, and other environmental materials in addition to biological and geological materials. (Little-Battelle)
W74-02361

EXTRACTION AND SPECTROPHOTOMETRIC DETERMINATION OF VANADIUM AS A MIXED LIGAND COMPLEX OF OXINE AND AZIDE,
Andhra Univ., Waltair (India). Dept. of Chemistry.
V. P. R. Rao, and Y. Anjaneyulu.
Mikrochimica Acta, No 4, p 481-490, 1973. 7 fig, 23 ref.

Descriptors: *Separation techniques, *Spectrophotometry, *Aqueous solutions, Heavy metals, Absorption, Colorimetry, Color.
Identifiers: *Vanadium, *Complexation, Sensitivity, Complexing agents, Chemical interference, Free energy of formation, Organic solvents, Magnetic moments, Recovery.

Vanadium, oxine and azide react at pH 3.5-4.5 to give a dark green solid which extracts into benzene giving dark green solution. The extract has absorption maxima at 415 nm and 620 nm with molar absorptivities 8650 and 6040 respectively. Spectrophotometric investigations reveal that the extracting species has V, HOx, and N3 (-) in the ratio 1 to 2 to 2. Beer's law is obeyed up to 8.10 micrograms and 10.50 micrograms of vanadium per ml at 415 nm and 620 nm, respectively. The sensitivity of the color reaction is 0.0065 microgram per sq cm at 415 nm and 0.009 microgram per sq cm at 620 nm. The percent extraction of V was found to be 90. The formation constant and the free energy of formation are 8.3 to 8.7 times 10 to the 6th power and -9.91 to -9.31 Cal respectively at 30 C. The interference of various foreign ions was studied and methods are proposed for the elimination of the interference of some of those substances. Infrared and magnetic data of the solid complex are given. (Little-Battelle)
W74-02362

SOME CHEMICAL AND BIOLOGICAL CHARACTERISTICS OF THE MISSISSIPPI RIVER BORDERING IOWA,
Iowa Univ., Iowa City.
For primary bibliographic entry see Field 05B.
W74-02363

PYRIDINE KETOXIMES AS ANALYTICAL REAGENTS: THE SPECTROPHOTOMETRIC DETERMINATION OF COBALT WITH 2--PYRIDYL-2-THIENYL-BETA-KETOXIME,
Windsor Univ. (Ontario). Dept. of Chemistry.
H. R. Notenboom, W. J. Holland, and R. G. Billinghurst.
Mikrochimica Acta, No 3, p 467-473, 1973. 1 fig, 2 tab, 19 ref.

Descriptors: *Spectrophotometry, *Cobalt, *Pollutant identification, *Aqueous solutions, *Chemical analysis, Methodology, Solvent extractions, Hydrogen ion concentration, Time, Chelation, Fluorides, Synthesis, Anions, Cations.
Identifiers: *Chromogenic reagents, 2-Pyridyl-2-thienyl-beta-ketoxime, *Trace levels, Chemical concentration, Ionic interference, Metal chelates, Sample preparation, Precision, Accuracy, Chemical concentration, Pyridine ketoxines, Chemical interference, Organic solvents, Characterization, Hydrochloric acid, Chloroform, Dichloromethane, Methyl isobutyl ketone, Benzene, Hexane, Carbon tetrachloride, Permanganates, Chromates, Disodium EDTA, Palladium, Platinum.

The synthesis and characterization of 2-pyridyl-2-thienyl-beta-ketoxime (I) and its application to the spectrophotometric determination of trace amounts of cobalt by extraction of the resulting chelate from strong hydrochloric acid solution into chloroform are described. Under the conditions of analysis the chelate has a maximum absorbance of 412 nm with a molar absorptivity of 20,000 and a Sandell sensitivity of 0.0029 microgram/sq cm. The optimal pH range for chelate formation was 7.0-10.8; the addition of sufficient HCl to make the sample solution 1.2-3.4 M gave reproducible results. The Co chelate in 3 M HC1 was stable for at least one week and the chloroform extracts for at least 2 hours. As little as 0.5 ml of reagent solution gave reproducible results. The chelate was completely extractable into chloroform and dichloromethane, partially extractable into methyl isobutyl ketone and benzene and non-extractable into hexane and carbon tetrachloride. A large number of ions did not interfere with the analysis; however, permanganate, chromate, disodium EDTA, fluoride, palladium, and platinum (2 and 4 plus) ions seriously interfered and must be absent from all determinations. (Holoman-Battelle)
W74-02364

DISTRIBUTION OF CAESIUM-137 IN BRITISH COASTAL WATERS,
Ministry of Agriculture, Fisheries and Food, Lowestoft (England). Fisheries Radiobiological Lab.
For primary bibliographic entry see Field 05B.
W74-02365

ANALYTICAL APPLICATIONS OF GAS CHROMATOGRAPHY OF METAL CHELATES,
Birmingham Univ. (England). Dept. of Chemistry.
For primary bibliographic entry see Field 02K.
W74-02366

DETERMINATION OF TRACE AMOUNTS OF CHROMIUM BY ATOMIC ABSORPTION SPECTROMETRY WITH A TANTALUM FILAMENT ATOMIZER,
Nagoya Univ. (Japan). Dept. of Synthetic Chemistry.
For primary bibliographic entry see Field 02K.
W74-02367

EXTRACTION OF BORIC ACID WITH ALIPHATIC 1,3-DIOLS AND OTHER CHELATING AGENTS,
Goteborg Univ. (Sweden). Dept. of Analytical Chemistry.
B. Egneus, and L. Uppstrom.
Analytica Chimica Acta, Vol 66, No 2, p 211-229, September 1973. 12 fig, 9 tab, 23 ref.

Descriptors: *Separation techniques, *Solvent extractions, *Methodology, *Aqueous solutions, Chelation, Boron, Chemical properties, Hydrogen ion concentration, Inorganic compounds, Infrared spectrophotometry, Nuclear magnetic resonance, Pollutant identification.
Identifiers: *Boric acid, *Chelating agents, *Chemical recovery, *Aliphatic 1 3-diols, Infrared spectra, NMR spectra, Ultraviolet spectra, Aliphatic hydrocarbons, Reagents, Organic solvents, Esterification, Ketones, Amines, Sample preparation, Inorganic acids, Ultraviolet spectrophotometry, Phenylethanediol-l 2, Propanediol-1 3, Catechol, 2 2'-Dihydroxybiphenyl, o-Hydroxyacetophenone, 4 4'-Methylene-bis (3-hydroxy-2-naphthoic acid), Benzoylacetone, 1 2-Cyclohexanedione, 2-Pyridylmethylacetate, 2-Pyridineethanol.

Some 40 compounds have been investigated with reference to their boric acid extraction properties. Preliminary tests showed that aliphatic 1,3-diols with at least 6 carbon atoms possess superior extraction qualities compared to diketones, hydroxyketones, hydroxyamines and other species investigated. The 1,3-diols were then further studied with attention to size and steric configuration. The extraction equilibria involved were thoroughly investigated for 2,2-diphenylpropanediol-1,3 (DPPD). The constants derived showed that this diol, in spite of its large hydrophobic groups, has a smaller reaction constant than the previously investigated 2,2-diethylpropanediol-1,3 (DEPD) and 2-ethylhexanediol-1,3 (TMPD), which seems to form a very stable ester with boric acid in chloroform at room temperature. The ester formation is supported by n.m.r. and i.r. spectra. The effect of geminal substituents in the 2-position is discussed. (Holoman-Battelle)
W74-02368

SEASONAL CHANGES IN THE ORGANIC FORMS OF CARBON, NITROGEN AND PHOSPHORUS IN SEA WATER AT EL IN THE ENGLISH CHANNEL DURING 1968,
Southampton Univ. (England). Dept. of Oceanography.
For primary bibliographic entry see Field 05B.
W74-02369

CHLORODIOXINS IN PESTICIDES, SOILS, AND PLANTS,
Agricultural Research Service, Beltsville, Md. Agricultural Environmental Quality Inst.
For primary bibliographic entry see Field 05B.
W74-02371

SAMPLING TECHNIQUES IN CHROMATOGRAPHY,
Waterloo Univ. (Ontario). Dept. of Chemistry.
For primary bibliographic entry see Field 07B.
W74-02372

COMPLEX BEHAVIOUR OF COBALT IN THE DANUBE RIVER,
Institut za Nuklearne Nauke Boris Kildric, Belgrade (Yugoslavia).
For primary bibliographic entry see Field 05B.
W74-02373

PRINTOUT COLORIMETER FOR AUTOANALYSIS OF WATER POLLUTION,
Upper Tame Main Drainage Authority, Birmingham (England).
X. V. M. Snaddon, S. A. Mayo, and J. Cope.
Process Biochemistry, Vol 8, No 9, p 15-17, September 1973. 3 fig, 3 ref.

Descriptors: *Colorimetry, *Water analysis, *Instrumentation, *Automatic control, Design criteria, Chemical oxygen demand, Ammonia, Nitrites, Electronic equipment, Data processing, Monitoring.

A dual-beam colorimeter was developed to perform routine and continuous monitoring. The criteria for the system were that it be reliable, automatic correction of electronic drift be provided, discrimination between channels be provided with a means of detecting plateaus and peaks and converting these maxima into concentration units, results be displayed in digital form, and sample identification be included with results. The system consists of four basic sections: the input amplifiers, linearizer, and subtractor; and analog to

digital converter and maximum memory system; the digital output stage; and the power supplies. The optical system is designed to withstand dropping without damage. Results of determinations of COD agreed closely with those obtained by other methods. Use of the system to determine ammonia-nitrogen and nitrite revealed that temperature variations and oxidation of reagents affected results. Suggestions are given for coupling alarms, automatic shutoff, and data accumulation systems to the colorimeter. (Little-Battelle)
W74-02374

INTERPRETATION OF INFRARED SPECTA USING PATTERN RECOGNITION TECHNIQUES,
Pennsylvania State Univ., University Park. Dept. of Chemistry.
For primary bibliographic entry see Field 02K.
W74-02376

THE FORMATION OF WATER-IN-OIL EMULSIONS SUBSEQUENT TO AN OIL SPILL,
Nova Scotia Technical Coll., Halifax. Dept. of Chemical Engineering.
For primary bibliographic entry see Field 05B.
W74-02377

ANALYZING HEAVY ENDS OF CRUDE,
Bureau of Mines, Bartlesville, Okla. Bartlesville Energy Research Center.
C. J. Thompson, J. E. Dooley, D. E. Hirsch, and C. C. Ward.
Hydrocarbon Processing, Vol 52, No 9, p 123-130, September 1973. 2 fig, 7 tab, 14 ref.

Descriptors: *Chemical analysis, *Methodology, *Separation techniques, Pollutant identification, Organic compounds, Mass spectromectry, Nuclear magnetic resonance, Distillation, Cation exchange, Anion exchange, Aromatic compounds.
Identifiers: *Crude oil, *Heavy distillates, *Oil characterization, Gach Saran crude oil, Chemical composition, Petroleum distillates, Saturates, Monaromatics, Diaromatics, Polyaromatic-polar compounds, Chemical treatment, Isothermal distillation, Boiling point, Aromatic hydrocarbons, Petroleum hydrocarbons, Gel permeation chromatography, Mass spectra, Silica-alumina gel chromatography, Liquid solid chromatography, Ion exchange resins, Polyaromatics, Gradient elution adsorption chromatography, NMR spectra, Molecular distillation.

A systematic procedure which utilizes isothermal and molecular distillation, chemical treatment, silica-alumina gel chromatography, gel permeation chromatography and spectrometry has been developed for the separation and characterization of heavy ends of petroleum. Some aspects of the procedure are described and applied to a 370-535 C (700-1000 F) distillate from Gach Saran, Iran, crude oil. In this application chromatography is utilized through anion and cation exchange resins to separate acids and bases, followed by chemical treatment with FeC13 to remove neutral nitrogen compounds. The distillate, then essentially free of acids, bases and neutral nitrogen compounds, is passed through a dual silica-alumina gel adsorption column, using gradient elution, to produce four well-defined concentrates; namely, saturates, monoaromatics, diaromatics and polyaromatic-polar compounds. Mass spectra were used to identify the general composition of each concentrate. A combination of gel permeation, mass spectrometric and nuclear magnetic resonance data was then used to further evaluate the adsoprtion concentrates of the distillate. The entire procedure is schematically outlined. (Holoman-Battelle)
W74-02378

CHARACTERIZATION OF WASTE EFFLUENTS FROM A COMMERCIAL PIMENTO CANNING OPERATION,
Georgia Experiment Station, Experiment.
W. A. Bough.
Journal of Milk and Food Technology, Vol 36, No 7, p 371-374, July 1973. 1 fig, 3 tab, 12 ref.

Descriptors: *Effluents, *Flow rates, *Waste identification, Industrial wastes, Food processing industry, Chemical analysis, Sampling, Pollutant identification, Chemical oxygen demand, Biochemical oxygen demand, Acidity, Hydrogen ion concentration, Suspended solids, Waste water (Pollution), Dissolved solids, Fruit crops.
Identifiers: *Pimiento cannery, Characterization, Sample preparation, Composite samples, Volatile solids, Settleable solids, Fixed solids, Total solids.

Composite samples of liquid effluents taken at each unit operation in pimiento processing every 30 min over a 2-hr period were passed through a 20-mesh screen to remove particulate material and analyzed in duplicate for the following characteristics: total, fixed, volatile, suspended, dissolved, and settleable solids; pH; total acidity; COD; and 5-day BOD. Flow rates were determined with a trapezoidal weir which was placed in the rectangular gutters carrying the effluents. Characterization of the unit effluents revealed significant patterns of difference in composition and flow rates. The most concentrated effluent occurred in the first stage of the processing operation where the roasted peel was removed by washing. The suspended solids load of this effluent accounted for 69 percent of the total suspended solids load and 37 percent of the COD load, but only 18 percent of the total flow. Segregation and separate treatment of this concentrated effluent is suggested to reduce the total waste load. Another conentrated effluent resulted from the citric acid dip before the packing and closing area. The flow of the effluent was only 10 percent of the total, but accounted for 32 percent of the total dissolved solids and 37 percent of the total BOD. Two effluents from the grading area accounted for 50 percent of the total flow and only 10 percent of the total COD load. Recycling of these dilute effluents to the peel removal operation is suggested. Based on the rate of processing, the total wastes produced from pimiento canning contained 3.2, 60.2, and 35.4 lb. of suspended solids, COD, and BOD, respectively, per ton of raw pimientos. The total waste flow was 4,840 gal. per ton. (Holoman-Battelle)
W74-02379

PHOTOLYSIS OF PARATHION (O,O-DIETHYL-O- (4-NITROPHENYL) THIOPHOSPHATE). NEW PRODUCTS,
Miami Univ., Oxford, Ohio. Hughes Labs.
For primary bibliographic entry see Field 05B.
W74-02380

PERSISTENCE OF ENDOTHALL IN AQUATIC ENVIRONMENT AS DETERMINED BY GAS-LIQUID CHROMATOGRAPHY,
Syracuse Univ. Research Corp., N.Y. Life Sciences Div.
For primary bibliographic entry see Field 05B.
W74-02381

RATES AND PRODUCTS OF DECOMPOSITION OF 2,2-DIBROMO-3-NITRILOPROPIONAMIDE,
Dow Chemical Co., Midland, Mich. Halogens Research Lab.
For primary bibliographic entry see Field 05B.
W74-02382

PICLORAM PHOTOLYTIC DECOMPOSITION,
Agricultural Research Service, Fort Collins, Colo.
For primary bibliographic entry see Field 05B.
W74-02383

GAS-LIQUID CHROMATOGRAPHIC DETERMINATION OF CHLORFENVINPHOS IN MILK, EGGS, AND BODY TISSUES OF CATTLE AND CHICKENS,
Agricultural Research Service, Kerrville, Tex. Livestock Insects Lab.
M. C. Ivey, D. D. Oehler, and V. H. Claborn.
Journal of Agricultural and Food Chemistry, Vol 21, No 5, p 822-824, September/October 1973. 2 fig, 2 tab, 6 ref.

Descriptors: *Chlorinated hydrocarbon pesticides, *Organophosphorus pesticides, *Milk, *Poultry, *Cattle, *Pollutant identification, Pesticide residues, Insecticides, Acaricides, Miticides, Solvent extractions, Farm wastes, Methodology, Chemical analysis, *Gas chromatography.
Identifiers: Flame photometric gas chromatography, Animal tissues, Chlorfenvinphos, Chemical recovery, Sample preparation, Cleanup, Detection limits, Sensitivity, Gas liquid chromatography, Eggs, Bioaccumulation, Liver, Heart, Kidneys, Feces, Fat tissue, Muscle.

A reliable and sensitive gas liquid chromatographic method is described in which a flame photometric detector is used to determine micro amounts of chlorfenvinphos in the milk and body tissues of cattle and in the body tissues, eggs, and manure of chickens. With extraction and cleanup, 0.002 ppm of the insecticide could be detected in milk and 0.001 ppm in body tissues and eggs. Recoveries of 83-100 percent were obtained from the fat, muscle, kidney, liver, and heart of cattle and from the fat, muscle, liver, skin, and manure of chickens. Recoveries of 93 percent were obtained from milk and 81 percent was obtained from eggs. (Holoman-Battelle)
W74-02384

ANALYSIS OF HIGH-PURITY WATER BY FLAMELESS ATOMIC-ABSORPTION SPECTROSCOPY. PART II. SIGNAL INTEGRATION WITH A NON-RESONANCE LINE CORRECTION SYSTEM FOR SPURIOUS ABSORPTION PHENOMENA,
European Atomic Energy Community, Ispra (Italy). Joint Nuclear Research Center.
C. J. Pickford, and G. Rossi.
Analyst, Vol 98, No 1166, p 329-334, May 1973. 4 fig, 1 tab, 15 ref.

Descriptors: *Chemical analysis, *Heavy metals, *Automatic control, Water analysis, Calibrations, Cobalt, Chromium, Copper, Iron, Manganese, Nickel, Lead, Trace elements, Automation, *Spectrophotometry.
Identifiers: *High purity water, Flameless atomic absorption spectrophotometry, Multielemental analysis, Graphite tube, Precision, Signal integration, Absorbance, Reproducibility.

A polychromator has been used in conjunction with a multi-channel integration system and an automatic sample injection unit in graphite-tube flameless atomic-absorption spectroscopy. The precision of the system has been evaluated at high and low absorbances, and its ability to compensate for spurious absorption and variable volatility effects examined. The use of a non-resonance line correction system and integration of the absorption signal improves the precision of graphite-tube flameless atomic-absorption spectoscopy, particularly at low concentration levels. Some variations in signal intensity caused by changes in the volatility of the sample can be eliminated, and the compensation for spurious absorption phenomena is satisfactory up to 95 percent absorption, provided that the reference line is close to the resonance line of the main element. With the automatic sampler the system does represent a first approach to a fully automatic scheme for multi-element determinations by flameless atomic-absorption spectroscopy. The results achieved indicate the feasibility and the applicability of such a system, particularly when a limited number of elements have to be determined on a routine basis or

when the limited size and the nature of the sample (toxicity and activity) could make cumbersome or impossible the determination of more elements. (Holoman-Battelle)
W74-02385

THE DETERMINATION OF METHYL MERCURY IN URINE,
Environmental Protection Agency, Perrine, Fla. Perrine Primate Lab.
R. T. Ross, and J. G. Gonzalez.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 3, p 187-192, September 1973. 2 fig, 14 ref.

Descriptors: *Urine, *Methodology, *Pollutant identification, Chemical analysis, Solvent extractions.
Identifiers: *Electron capture gas chromatography, *Methylmercury, Sample preparation, Cleanup, Chemical recovery, Cysteine acetate, Acidification, Organic solvents, Organomercury compounds, Body fluids, Biological samples, Methylmercury chloride.

Described is a modification of the procedure for the determination of methyl mercury in urine employing a cysteine acetate cleanup procedure and analysis using the GLC-EC technique. A urine sample is pipetted into a stoppered centrifuge tube and acidified to pH 1 with concentrated HCl. Benzene is added to the mixture and shaken vigorously for 5 min. The emulsion was broken by centrifugation, and the organic layer removed by a disposable pipette. The urine is extracted again as described above. The organic layers were combined, and an aliquot was removed and extracted with cysteine acetate solution. The mixture was shaken vigorously, the layers separated, and an aliquot acidified to pH 1 with HCl and extracted with two portions of benzene. The benzene layers were combined, dried over anhydrous sodium sulfate and stored in a glass stoppered test tube until GLC analysis. This method is capable of detecting ppb of methyl mercuric chloride (MMC) and combines high recoveries and rapid analysis time in a single procedure. Since binding of MMC to urine constitutents is fast and complete, acidification of the urine to pH 1-2 is absolutely necessary prior to benzene extraction. The cleanup procedure using cysteine acetate solution is also essential for the elimination of interfering GLC peaks. (Holoman-Battelle)
W74-02387

A MODIFIED EXTRACTION METHOD FOR DETERMINATION OF MINERAL OIL IN SEA WATER,
D. R. Hughes, R. S. Belcher, and E. J. O'Brien.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 3, p 170-171, September 1973. 1 tab, 1 ref.

Descriptors: *Water analysis, *Sea water, *Separation techniques, *Oil, Oily water, Solvent extractions, Oil pollution.
Identifiers: *Recovery, *Infrared absorption, Crude oil, Sample preparation, Efficiency, Mineral oil.

Synthetic seawater samples for evaluation of three oil-extraction procedures were prepared by adding sodium chloride to distilled water and spiking with 3.8 to 188 ppm Bass Strait Crude Oil. The three extraction techniques were (1) reciprocal shaking with carbon tetrachloride, (2) stirring with a stainless steel impeller with carbon tetrachloride, and (3) same procedure as (2) in an ultrasonic cleaning bath. Extractions were for 15 minutes, after which samples were allowed to stand overnight. Further separation was carried out in a separatory funnel. The third procedure required centrifuging to separate phases. Extracts were added to a Florisil column, eluted with carbon tetrachloride, and the summed infrared absorption determined for the eluate. Recoveries which were determined from calibration curves were best (mean value 102 percent) using the stirring-ultrasonic dispersion method. (Little-Battelle)
W74-02388

VOLTAMMETRIC IDENTIFICATION OF ORGANOCHLORINE INSECTICIDES, POLYCHLORINATED BIPHENYLS, POLYCHLORINATED NAPHTHALENES AND POLYCHLORINATED BENZENES,
Montana State Univ., Bozeman. Dept. of Chemistry.
S. O. Farwell, F. A. Beland, and R. D. Greer.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 3, p 157-165, September 1973. 2 fig, 4 tab, 8 ref.

Descriptors: *Pollutant identification, *Polychlorinated biphenyls, *Chlorinated hydrocarbon pesticides, Chemical analysis, Pollutants, Organic compounds, Electrochemistry, DDE, Heptachlor, Dieldrin, Aldrin, Insecticides, Methodology, Equipment.
Identifiers: Fingerprinting, *Polychlorinated naphthalenes, Voltammetry, *Voltammetric detector, *Polychlorinated benzenes, Characterization, Chlorinated hydrocarbons, Isomers, Reduction potentials, Biphenyl, Voltammograms, 1 3 5 7-Tetrachloronaphthalene, Hexachlorobenzene, 2 4 5 2' 4' 5'-Hexachlorobiphenyl, Lindane, Chlordene, trans-Chlordane, 2-Chlorobiphenyl, 2 5-Dichlorobiphenyl, 2 6-Dichlorobiphenyl, 2 4 5-Trichlorobiphenyl, 3 4 5-Trichlorobiphenyl, 2 3 5 6-Tetrachlorobiphenyl.

The need for an analytical method which would provide for the exact identification or 'fingerprinting' of chlorinated hydrocarbons in the environment prompted the study of the possibility of using a voltammetric detector. This detector could provide both gross classification, such as distinguishing between polychlorinated biphenyls (PCB) and polychlorinated naphthalenes (PCN), and identification of the specific isomer in each class of compound. This research represents the first in the voltammetric reduction of PCB's and PCN's and provides a preliminary description of the analytical methodology applicable to the rapid identification of these compounds. The apparatus used employed three-electrode potentiostatic control circuitry with interruptable linear voltage sweep control. All solutions were 0.5 mM in the electroactive species with dimethyl sulfoxide as the solvent and 0.1 M tetraethylammonium bromide as the supporting electrolyte. Nitrogen gas was used for deaeration. The voltage values for the compounds analyzed are tabulated. (Holoman-Battelle)
W74-02389

INTERCALIBRATION OF ANALYSES OF RECENTLY BIOSYNTHESIZED HYDROCARBONS AND PETROLEUM HYDROCARBONS IN MARINE LIPIDS,
Woods Hole Oceanographic Institution, Mass.
J. W. Farrington, J. M. Teal, J. G. Quinn, T. Wade, and K. Burns.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 3, p 129-136, September 1973. 1 fig, 1 tab, 12 ref.

Descriptors: *Lipids, *Methodology, *Calibrations, Pollutant identification, Isolation, Organic compounds, Chemical analysis, Oil, Separation techniques, Solvent extractions, *Gas chromatography.
Identifiers: Natural organics, Marine environment, Interlaboratory studies, Flame ionization gas chromatography, *Petroleum hydrocarbons, Chemical composition, Chemical concentration, Column chromatography, Thin layer chromatography, Accuracy, Precision, Sample preparation, Biosynthesis, Petroleum products, Pristane, Squalene, Saponification, Petroleum distillates, Phytane, Phytadienes, n-Alkanes, South Louisiana crude oil.

An intercalibration exercise has been conducted to determine the accuracy and precision of hydrocarbon analyses. Column chromatography or thin layer chromatography was used to isolate the hydrocarbons from other lipids. Gas chromatography was then used as a screening method to select hydrocarbon extracts whih would be further analyzed by GC-mass spectrometry and other combinations of spectrophotometric and wet chemistry methods to determine the concentration of petroleum hydrocarbons in the samples. The presence or absence of the unresolved complex mixture signal in the hydrocarbon gas chromatograms served as the initial criterion for determining petroleum contamination. A homologous series of peaks in the chromatograms provided supplemental evidence of petroleum contamination which was then confirmed analytically. Three laboratories analyzed a reference sample (IDOE-5) consisting of cod liver lipids spiked with 371.8 ppm of a distillate cut (nC16 to nC28) of South Louisiana crude oil. The results were fairly accurate and agreed very well for the concentrations of both petroleum and recently biosynthesized pristane and squalene. Using GC as the initial screening method is fairly accurate and precise for hydrocarbons in the boiling range 287-450C with a polarity suitable for column or thin layer chromatographic isolations. The methods as employed here would not detect asphaltenes; O, N, S containing aliphatic and cyclic compounds; nor concentrations of hydrocarbons much above or below the boiling range specified above. (Holoman-Battelle)
W74-02390

THE DETERMINATION OF PENTACHLOROPHENOL AND HEXACHLOROPHENE IN HUMAN ADIPOSE TISSUE,
Environmental Protection Agency, Perrine, Fla. Perrine Primate Lab.
T. M. Shafik.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 1, p 57-63, July 1973. 2 fig, 1 tab, 15 ref.

Descriptors: *Chemical analysis, *Pollutant identification, *Mass spectrometry, Separation techniques, Solvent extractions, Phenolic pesticides, Chlorinated hydrocarbon pesticides, *Gas chromatography, Methodology, Antibiotics (Pesticides), Bactericides, Fungicides, Pollutants.
Identifiers: Electron capture gas chromatography, *Adipose tissue, Pentachlorophenol, *Trace levels, Quantitative analysis, *Hexachlorophene, Chemical recovery, Sample preparation, Animal tissue, Chlorinated hydrocarbons, Ethylation, Organic solvents.

A method was developed for determining low levels of pentachlorophenol (PCP) and hexachlorophene (HCP) in human adipose tissue. 200 mg of adipose tissue were accurately weighed into a Duall tissue grinder to which hexane was added. The sample was mixed on a Vortex mixer and allowed to stand for about 30 min. The sample was then ground, washed with hexane, and combined with 10 percent NaOH. This mixture was then mixed on the Vortex mixer for 1 min and centrifuged to separate the 2 layers. Several extractions with hexane and diethyl ether were carried with the final hexane extract containing ethylated PCP and HCP being transferred to a silica gel microcolumn for separation. Identification was made by electron capture gas chromatography. Confirmation of the diethyl ether of hexachlorophene and the ethyl ether of pentachlorophenol was accomplished by mass spectral direct probe analysis. The limits of detectability for PCP and HCP in adipose tissue are 5 and 10 ppb, respectively. Samples from the pooled human fat weighing 100-300 mg were analyzed for both

PCP and HCP using the procedure described in the analysis of adipose tissue. An average of 5 ppb PCP was found in six replicates and 30 ppb HCP in 10 replicates of human adipose tissue. Replicate samples of the pooled fat (100-300 mg) were spiked with 4.6 ng PCP and 10 ng HCP. The average recoveries of PCP and HCP from the replicates analyzed were 75 percent and 96 percent, respectively. (Holoman-Battelle)
W74-02391

POLYCHLORINATED TERPHENYLS IN PAPERBOARD SAMPLES,
Ontario Research Foundation, Sheridan Park. Pesticide and Trace Analytical Lab.
G. H. Thomas, and L. M. Reynolds.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 1, p 37-41, July 1973. 2 fig, 10 ref.

Descriptors: *Chemical analysis, *Pollutant identification, *Polychlorinated biphenyls, *Gas chromatography, Methodology, Estimating, Organic compounds, Pollutants, Foods, Aroclors.
Identifiers: *Polychlorinated terphenyls, *Paperboard, Packaging materials, Sample preparation, Aroclor 5460, Electron capture gas chromatography.

The detection, estimation, and confirmation of the identity of polychloroterphenyls (PCTs) as well as polychlorobiphenyls (PCBs) are described for paperboard and food packaging material. The sample is blended, and an aliquot Soxhlet extracted, concentrated, cleaned-up on Florisil, and subjected to a 'PCB split' on Florisil. For waxy samples, the residue from extraction is dissolved in 5 percent benzene in acetone with slight warming; the solution chilled in a dry ice/methanol bath for 3 min; the flocculent precipitate filtered; and the filtrate concentrated and treated as above. The PCT content of cleaned-up sample extracts is screened and quantified using gas chromatography. Approximately 100 paperboard samples have been analyzed with PCT levels of 0-163 ppm and PCB levels of 0-20 ppm. Two satisfactory gas chromatography systems have been developed for the estimation of PCTs. (Holoman-Battelle)
W74-02392

THE USE AND EFFECT OF MIXED STANDARDS ON THE QUANTITATION OF POLYCHLORINATED BIPHENYLS,
National Marine Fisheries Service, Seattle, Wash. Pacific Fishery Products Technology Center.
F. L. Beezhold, and V. F. Stout.
Bulletin of Environmental Contamination and Toxicology, Vol 10, No 1, p 10-15, July 1973. 2 fig, 1 tab, 12 ref.

Descriptors: *Polychlorinated biphenyls, *Pollutant identification, *Separation techniques, Aroclors, Chemical analysis, Fish, Gas chromatography, Channel catfish.
Identifiers: *Quantitative analysis, *Mixed standards, Animal tissues, Mixtures, Menhanden, Brevoortia tyrannus, Ictalurus punctatus, Carcharhinus falciformis, Aroclor 1254, Aroclor 1260, Liver, Fish meal.

A study was made of the problems encountered when the chromatogram of a sample being analyzed for PCB's via GLC cannot readily be compared to a particular Aroclor standard. The use of mixed Aroclor standards was proposed and a study made of the effect of mixed standards on the analytical results. It was found that the choice of a standard could alter the values by more than a factor of 2. In addition, the particular mixture used as a standard should be reported along with resulting values. (Holoman-Battelle)
W74-02393

APPLICATIONS, INVOLVING THE IODIDE ION. VIII. DIRECT AND INDIRECT DETERMINATION OF MERCURY (I) AND ANALYSIS OF MIXTURES. ANALYSIS OF CHROMIUM (VI)-CHROMIUM (III) MIXTURES. DETERMINATION OF HYPOCHLORITE,
Cairo Univ., Giza (Egypt). Faculty of Science.
H. Khalifa, and Y. M. Issa.
Microchemical Journal, Vol 18, No 4, p 436-444, August 1973. 8 tab, 11 ref.

Descriptors: *Mercury, *Volumetric analysis, *Chromium, *Methodology, Iodides, Heavy metals, Aqueous solutions, Chemical analysis, Pollutant identification.
Identifiers: *Potentiometric titration, *Hypochlorites, Mixtures, Accuracy, Precision, Detection limits.

Mercury (I), down to 3 ppm, has been accurately determined by direct titration with iodide or by back-titrating excess of iodide with mercury (II) using silver amalgam as the indicator electrode. The direct method and additional volumetric ones were applied to the rapid analysis of various mixtures involving mercury (I) with fair accuracy and precision. Analysis of Cr (VI)-Cr (III) mixtures involved potentiometric back-titration of excess iodide and of excess EDTA separately with mercury (II). Back-titration of excess iodide was successfully applied to the determination of hypochlorite. (Holoman-Battelle)
W74-02395

MICRODETERMINATION OF ARSENIC (III) AND OSMIUM (VIII) THROUGH OSMIUM--THIOUREA REACTION,
Andhra Univ., Waltair (India). Dept. of Chemistry.
P. P. Naidu, and G. G. Rao.
Microchemical Journal, Vol 18, No 4, p 422-427, August 1973. 1 fig, 3 tab, 3 ref.

Descriptors: *Chemical analysis, *Aqueous solutions, *Pollutant identification, *Chemical reactions, Color reactions, Spectrophotometry, Cations, Anions, Alkali metals, Alkaline earth metals, Heavy metals, Catalysts, Halogens, Methodology.
Identifiers: *Arsenic, *Osmium, Trace levels, Quantitative analysis, Ionic interference, Accuracy, Chemical interference, Osmium-thiourea reaction, Complexation, Thiourea.

The osmium-thiourea reaction described in previous methods for the determination of osmium and arsenic was slow under the conditions utilized. A new method has been proposed for the rapid determination of osmium without waiting 30 minutes for the attainment of full color intensity. With this procedure only 1 ml of 1 percent thiourea is necessary. Arsenic (III) catalyzed the reaction. Qualitative and quantitative methods are described for the determination of both osmium and arsenic. Interference study of 30 ions showed they do not interfere. (Holoman-Battelle)
W74-02396

A HIGH-SPEED LIQUID CHROMATOGRAPH WITH A FLOW-SPECTROFLUORIMETRIC DETECTOR AND THE ULTRAMICRO-DETERMINATION OF AROMATIC COMPOUNDS,
Kyoto Univ. (Japan). Dept. of Chemistry.
H. Hatano, Y. Yamamoto, M. Saito, E. Mochida, and S. Watanabe.
Journal of Chromatography, Vol 83, p 373-380, August 29, 1973. 6 fig, 1 tab, 10 ref.

Descriptors: *Instrumentation, *Chemical analysis, *Aromatic compounds, *Pollutant identification, *Organic compounds, Laboratory equipment, Separation techniques, Vitamins, Fluorescence, Methodology, Research equipment.
Identifiers: High speed liquid chromatography, Flow spectrofluorimetric detector, Quantitative analysis, Spectrofluorimetry, Trace levels, Sensitivity, Aromatic hydrocarbons, Vitamin B2, Vitamin B3, Vitamin B6, Naphthalene, Anthracene, Pyrene, Emission spectra, Benz (a)anthracene, Benz (a)pyrene, Benz (e)pyrene, Excitation spectra.

A high-speed liquid chromatograph has been used with a new spectrofluorimetric detector, which is more sensitive than a normal ultraviolet absorption or spectrophotometric detector for fluorescent compounds. The spectrofluorimeter is equipped with double-beam optics and with a flow-cell, 3 microliters in volume, and is used to record the emission and excitation spectra of the separated components during the chromatographic separation by stopping the elution at peak maxima. This technique enables both qualitative identification and quantitative determination of the separated components. Selective recording of chromatograms is possible by varying the wavelengths for emission and excitation. Mixtures of vitamins B2, B3, and B6, and of naphthalene, anthracene, pyrene, benz (a)anthracene, benz (a)pyrene and benz (e)pyrene have been separated and identified. (Holoman-Battelle)
W74-02397

ION-EXCHANGE SEPARATIONS ON MIXED COLUMNS,
Tokyo Univ. (Japan). Inst. of Industrial Science.
T. Yamabe.
Journal of Chromatography, Vol 83, p 59-65, August 29, 1973. 4 fig, 4 ref.

Descriptors: *Separation techniques, *Cations, Heavy metals, Anion exchange, Cation exchange, Hydrogen ion concentration, Ion exchange, Organic acids, Copper, Zinc, Lead, Cobalt, Cadmium.
Identifiers: Mixed columns, *Ion exchange chromatography, Ion exchange resins, *Elution, *Organic hydroxy acids, Rare earth elements, Lactic acid, Tartaric acid, Chelating agents, Terbium, Lutetium, Thulium, Erbium, Holmium, Dysprosium, Gadolinium, Eluents, Retention time, Europium, Samarium, Neodymium, Praseodymium, Cerium, Chemical concentration.

The separation of metal ions by elution with a solution containing a chelate-forming agent, namely an organic hydroxy acid (lactic acid or tartaric acid) was investigated by changing the mixing ratio (gamma) of the cation- and anion-exchange resins and by changing the pH of the eluent. When the concentration of lactic acid was 0.5 M at pH 2.8 and gamma equals 1/2, a mixed sample of Lu, Tm, Er, Ho, Dy, Tb and Gd was completely separated within 100 min. When the concentration of tartaric acid was 0.25 M at pH 3.0 and gamma equals 2, a mixed sample of Cu, Zn, Pb, Co and Cd was completely separated within 90 min. (Holoman-Battelle)
W74-02398

DETERMINATION OF ZINC BY FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETRY,
Ohio State Univ., Columbus. Coll. of Medicine.
D. Kurz, J. Roach, and E. J. Eyring.
Analytical Biochemistry, Vol 53, No 2, p 586-593, June 1973. 2 tab, 40 ref.

Descriptors: *Zinc, *Aqueous solutions, *Chemical analysis, Urine, Instrumentation, Pollutant identification, Anions, Cations, Heavy metals, Methodology, Calcium, Iron, Copper, Potassium, Sodium, Nitrates, Sulfates, Iodides, Chlorides.
Identifiers: *Biological samples, *Flameless atomic absorption spectrophotometry, Serum, Ionic interference, Chemical recovery, Sample preparation, Body fluids, Chemical interference, Lithium, Acetates.

The flameless atomic absorption method described is a simple, rapid, accurate

microtechnique for determining zinc in aqueous solutions, serum, or urine. It requires no sample pretreatment, only 1.0 microliter of sample per determination, no correction for viscosity differences between sample and standard solutions, and is not subject to ionic or organic interference. The average recovery of added zinc in serum is 97.5 percent and in urine is 97.6 percent. The values obtained for serum (mean plus or minus SD: 94.6 plus or minus 11.0 micrograms/100 ml; N equals 25) and urine (range: 600-1000 micrograms/24 hr; N equals 4) are comparable to the values reported in the literature. The coefficient of variation was less than 5.0 percent in all cases. The qualitative concentration limit was 0.009 microgram/100 ml. The techniques and instrumentation described are also applicable to a number of trace minerals of common interest. (Holoman-Battelle)
W74-02399

ATOMIC ABSORPTION AND FLUORESCENCE SPECTROMETRY WITH A CARBON FILAMENT ATOM RESERVOIR. PART XIV. THE DETERMINATION OF VANADIUM IN FUEL OILS,
Imperial Coll. of Science and Technology, London (England). Dept. of Chemistry.
G. L. Everett, T. S. West, and R. W. Williams.
Analytica Chimica Acta, Vol 66, No 2, p 301-303, September 1973. 1 tab, 3 ref.

Descriptors: *Chemical analysis, *Pollutant identification, Instrumentation, Solvent extractions, Heavy metals, Methodology, Separation techniques, Pollutants, Oil, *Spectrophotometry.
Identifiers: Petroleum products, *Fuel oil, Atomic absorption spectrophotometry, Fluorescence spectrophotometry, Carbon filament atom reservoir, *Vanadium, Reproducibility, Precision, Detection limits, Sensitivity, Acid stripping, Extraction efficiency, Sample preparation, Organic solvents, 1- (2-Pyridyl-azo-2-naphthol), Inorganic acids, Hydrochloric acid.

The carbon filament atom reservoir technique for determining vanadium in aqueous media and Cu, Ag, and Ni in lubricating oils has been extended to include vanadium in petroleum products. A 10-ml sample solution was shaken with 2 M HCl for 5 min and separated. 0.1 percent 1- (2-pyridyl-azo-2-naphthol) (PAN) in ethanol was added to the acid layer and the pH adjusted to 4.0 with concentrated ammonia. The vanadium-PAN complex was then extracted with chloroform and analyzed. This method has an overall extraction efficiency of greater than 95 percent; the detection limit of V in the original sample is 0.007 ppm (w/w). The sensitivity of the method (1 percent abs.) was 0.013 pg and the detection limit (S:N equals 2) was 0.03 pg; the reproducibility for 15 replicates at the 10-ng level was plus or minus 4 percent. (Holoman-Battelle)
W74-02400

NUCLEAR MAGNETIC RESONANCE RELAXATION TITRATION,
Technische Hochschule, Darmstadt (West Germany). Eduard-Zintl-Institut.
For primary bibliographic entry see Field 02K.
W74-02402

ISOLATION AND CLEANUP OF ORGANOPHOSPHORUS INSECTICIDES AND THEIR OXONES FROM ANIMAL TISSUES,
Institute of Industrial Hygiene and Occupational Diseases, Bratislava (Czechoslovakia).
A. Hladka, and J. Kovac.
Zeitschrift fur Analytische Chemie, Vol 265, No 5, p 339-342, July 30, 1973. 3 fig, 1 tab, 10 ref.

Descriptors: *Isolation, *Pollutant identification, *Radiochemical analysis, *Phosphothioate pesticides, *Pesticide residues, Solvent extractions, Organophosphorus pesticides, Insecticides, Radioactivity techniques, Chemical analysis, Selectivity.
Identifiers: *Oxones, Animal tissues, Radiochromatography, Isomers, Chemical recovery, Precision, Sample preparation, Metabolites, Cleanup, Malathion, Blood, Muscle, Liver, Parathion, Malaoxone, Paraoxone, Fenitrothion, Fenitrooxone, Paper chromatography, Sensitivity, Rats.

A simple isolation and cleanup procedure has been developed for the determination of organophosphorus insecticides and their oxones in animal tissues. This procedure partly unites extraction of organophosphorus pesticides and their oxones with cleanup by column chromatography. Most polar coextracts remain on the column and in its further processing the eluate does not tend to form emulsion. The process has been studied on model mixtures of P-32- and C-14-labelled pesticides with tissues as well as after application of pesticides to white rats. The average recovery of the method is 90.5 percent, with a standard deviation of plus or minus 5.1 percent. (Holoman-Battelle)
W74-02403

SELECTION OF EXPERIMENTAL CONDITIONS FOR THE PHOTOMETRIC COMPLEX FORMATION TITRATIONS OF METALS IN THE PPM-RANGE,
Amsterdam Univ. (Netherlands). Physics Lab.
J. Kragten.
Zeitschrift fur Analytische Chemie, Vol 264, No 5, p 356-361, June 13, 1973. 8 fig, 13 ref.

Descriptors: *Metals, *Pollutant identification, Volumetric analysis, Chemical analysis, Zinc, Color reactions, Photometry, Selectivity.
Identifiers: Complexometric titration, *Chemical indicators, *Metal complexes, Travel levels, Chromogenic reagents, Bismuth, Absorbance, EDTA, Xylenol Orange, Thorium, Precision, Data interpretation, Semi Xylenol Orange, Complexation, PAR, TAR.

Metals can be complexometrically titrated in the ppm-range in the presence of equivalent amounts of indicator. When (2:2) metal-indicator complexes predominate in solution, the end-points found from the 'L'-shaped absorbance-volume curves by extrapolation, are generally systematically shifted. This can be avoided by a proper choice of the indicator. Mathematical conditions previously derived are transformed to practical titration conditions, which, applied to diagrams for Bi and Zn, lead to the selection of optimum experimental conditions for these metals. The procedure is generally applicable and remains suitable even when a lack of data requires some preliminary investigations. (Holoman-Battelle)
W74-02404

AMPEROMETRIC TITRATION OF MERCURY (II) WITH EDTA, DTPA AND TRIEN IN THE PPM-RANGE,
Laboratorium voor Analytische Scheikunke, Amsterdam (Netherlands).
W. E. van der Linden, and J. Dieker.
Zeitschrift fur Analytische Chemie, Vol 264, No 5, p 353-355, June 13, 1973. 2 fig, 1 tab, 2 ref.

Descriptors: *Volumetric analysis, *Mercury, Electrochemistry, Heavy metals, Trace elements, Chemical analysis, Hydrogen ion concentration, Iron, Copper, Pollutant identification.
Identifiers: *Amperometric titration, *EDTA, *DTPA, *TRIEN, *Metal complexes, Trace levels, Rotating gold electrodes, Chemical interference, Precision, Bismuth, Thorium, Rotating mercury film electrodes, Rotating platinum electrodes, Metal-DTPA complexes, Metal-EDTA complexes, Metal-TRIEN complexes, Stability constants.

Mercury (II) can be titrated at pH 2.5-3 with EDTA, DTPA and TRIEN. The titration is followed amperometrically making use of a rotating gold-electrode at a potential of plus 0.25 V vs. S.C.E. Especially the use of DTPA allows the determination of small amounts of mercury (II (down to 1 microgram). The standard deviation is 2-3 percent. A correction for the systematic negative error of approximately 4 percent in the case of EDTA and 8 percent in the case of DTPA, mainly caused by the faradaic reaction at the electrode, can easily be made. Bismuth, iron and thorium will interfere, but on addition of fluoride the interference of thorium and iron can be masked. TRIEN showing a better selectivity of mercury towards iron has the lowest conditional stability constant and will not be suited to the titration of very low concentrations. Copper may be present in a thousand fold concentration. About equivalent amounts of iron (III) can be titrated in one run with mercury. In that case two end-points are obtained, the first one for iron, the second one for mercury. The ratio of the conditional constants of mercury to those for copper and iron is more favorable for DTPA and especially TRIEN. (Holoman-Battelle)
W74-02405

ANALYSIS BY MEANS OF GAS BUBBLE ELECTRIFICATION,
Imperial Coll. of Science and Technology, London (England). Dept. of Metallurgy.
For primary bibliographic entry see Field 02K.
W74-02406

A PNEUMATIC SAMPLE CHANGER FOR GAMMA-RAY SPECTROSCOPY,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 07B.
W74-02407

ANALYSIS OF ALKYL ETHOXYLATES BY NMR,
Canada Packers Ltd., Toronto (Ontario). Research and Development Labs.
C. K. Cross, and A. C. MacKay.
Journal of the American Oil Chemists' Society, Vol 50, No 7, p 249-250, July 1973. 1 fig, 1 tab, 5 ref.

Descriptors: *Nuclear magnetic resonance, Surfactants, *Pollutant identification.
Identifiers: *Alkyl ethoxylates, Characterization, Nonionic surfactants, Sample preparation, Polymerization, Ethoxylates.

A new, fast, simple technique is presented, which allows complete characterization of alkyl ethoxylates in terms of average chain length of the alkyl portion and degree of polymerization. The method uses trimethylsilylation of the terminal-OH of alkyl ethoxylate to obtain a sharp distinct internal standard of nine hydrogens per molecule. The number of hydrogens responsible for the NMR at 0.7-1.5 and 3.0-3.9 ppm can be calculated and, consequently, the average chain length and average number of ethylene oxide units. Water and ethanol do not interfere since they are removed in the reaction. Results for several commercial alkyl ethoxylates were in good agreement with compositions stated by the manufacturers. (Little-Battelle)
W74-02408

IRON, ZINC, MAGNESIUM, AND COPPER CONCENTRATIONS IN BODY MEAT OF THE BLUE CRAB, CALLINECTES SAPIDUS,
Maryland Univ., Solomons. Natural Resources Inst.
D. D. Boon.
Chesapeake Science, Vol 14, No 2, p 143-144, June 1973. 1 tab, 2 ref.

Descriptors: *Copper, *Iron, *Zinc, *Magnesium, Heavy metals, Foods, *Crabs.

Identifiers: *Blue crab, Sample preparation, Atomic absorption spectrophotometry, Macroinvertebrates, Biological samples, Bioaccumulation, Callinectes sapidus, Animal tissues.

Body meat of the blue crab, Callinectes sapidus, was analyzed by atomic absorption for iron, zinc, magnesium, and copper. Samples were taken biweekly from May 6, 1971 to April 19, 1972, a total of twenty-six determinations over a one-year period. For each determination, a one pound can of unpasteurized 'regular' or 'special' crab body meat was purchased locally. One hundred grams of this meat were homogenized with 100 g of distilled water in a high speed blender and acid digested. Concentrations found were as follows: iron, 7-66 ppm; zinc, 36-68 ppm; magnesium, 384-527 ppm; and copper, 5-97 ppm. Concentrations of copper were high during May, 1971, but no seasonal trend was found. Iron and copper values were near those found by other investigators in 1939; magnesium contents were higher. (Little-Battelle)
W74-02409

AN IMPROVED BOTTOM-WATER SAMPLER,
University Coll. of Swansea (Wales). Dept. of Geology and Oceanography.
For primary bibliographic entry see Field 07B.
W74-02410

HANGING MERCURY DROP ELECTRODEPOSITION TECHNIQUE FOR CARBON FILAMENT FLAMELESS ATOMIC ABSORPTION ANALYSIS. APPLICATION TO THE DETERMINATION OF COPPER IN SEA WATER,
Texas Univ., Austin. Dept. of Chemistry.
For primary bibliographic entry see Field 02K.
W74-02411

ADSORPTION CHARACTERISTICS OF SILBER, LEAD, CADMIUM, ZINC, AND NICKEL ON BOROSILICATE GLASS, POLYETHYLENE, AND POLYPROPYLENE CONTAINER SURFACES,
Chadron State Coll., Neb.
A. W. Struempler.
Analytical Chemistry, Vol 45, No 13, p 2251-2254, November 1973. 5 fig, 1 tab, 8 ref.

Descriptors: *Adsorption, *Aqueous solutions, *Heavy metals, *Ions, *Plastics, Physical properties, Lead, Cadmium, Zinc, Nickel, Chemical analysis, Hydrogen ion concentration, Temperature, Lighe, Methodology, Sampling, Stability, Precipitation (Atmospheric).
Identifiers: Borosilicate glass, Polypropylene, Storage containers, *Chemical loss, Silver, Flameless atomic absorption spectrophotometry, Acidification, Trace levels.

Container absorption of low concentrations of Ag, Pb, Cd, Zn, and Ni ions in aqueous solutions was studied using flameless atomic absorption spectrometry in order to develop a workable method for studying trace quantities of these ions in natural precipitation (rain, snow, hail). Only new containers (Borosilicate glass, polyethylene, polypropylene) were used after rigorous cleaning. Fifty milliliters of test solution were stored in each container during the aging period and analyzed initially at daily intervals. After several days analyses were made at 2- to 3-day intervals, or longer. The adsorption of Ag ion on borosilicate glass and polypropylene containers was studied as related to light and temperature. No single container type proved satisfactory for all ions. Polyethylene containers did not absorb cadmium or zinc. Acidification to pH 2 with HNO3 prevented silver, lead, cadmium, and zinc absorption on borosilicate glass surfaces. Acidification also prevented absorption of silver on polyethylene surfaces. Additionally, silver solutions must be maintained in the dark, even under acidified conditions, to maintain stability and minimize adsorption loss. New polypropylene containers could not be cleaned satisfactorily for cadmium and zinc studies. Extreme care was necessary to minimize contamination when working with the low ion concentrations detectable by flameless atomic absorption spectrometry. (Holoman-Battelle)
W74-02412

ENHANCEMENT OF THE SENSITIVITY AND SELECTIVITY OF THE COULSON ELECTROLYTIC CONDUCTIVITY DETECTOR TO CHLORINATED HYDROCARBON PESTICIDES,
Purdue Univ., Lafayette, Ind. Dept. of Entomology.
J. W. Dolan, and R. C. Hall.
Analytical Chemistry, Vol 45, No 13, p 2198-2204, November 1973. 7 fig, 3 tab, 10 ref.

Descriptors: *Chlorinated hydrocarbon pesticides, *Selectivity, *Separation techniques, *Gas chromatography, Polychlorinated biphenyls, Pollutant identification, Heptachlor, Temperature, Dieldrin, DDT, Aldrin, Endrin.
Identifiers: *Sensitivity, *Electrolytic conductivity detector, Detection limits, Gas flow rates, Furnace temperature, Chemical composition, Reaction gas, Aroclor 1254, Electrolytic conductivity gas chromatography, Heptachlor epoxide, alpha-Chlordane, o p'-DDT, Thermal degradation, Solvent systems, Ethanol, Dimethylsulfoxide, Formamide, gamma-Chlordane, Lindane, Pentachloronitrobenzene, p p' -DDT, p p' -DDE, Methoxychlor, Chlorobenzene, 1 2-Dichlorobenzene, 1 3-Dichlorobenzene, 1 4-Dichlorobenzene, 1 2 3-Trichlorobenzene.

Factors which influence the sensitivity and selectivity of the Coulson electrolytic conductivity detector to chlorinated hydrocarbon pesticides were determined and optimized. The most influential factors which affect sensitivity are absorptive surfaces, electrode polarization, system stability, and furnace temperature. Replacement of the standard 4-mm i.d. quartz reaction tube with one of 0.5-mm i.d., replacement of the silicone rubber septum at the furnace exit with a teflon fitting, and increasing the maximum cell voltage to 44 V dc resulted in a minimum detectability of 0.1 ng for heptachlor and a useable sensitivity of 0.4 ng as compared to 2 ng and 5 ng, respectively, for the unmodified detector. The most influential factors which affect selectivity are funace temperature, reaction gas composition, and reaction gas flow rate. Optimization of these parameters enables most chlorinated hydrocarbon pesticides to be selectively determined in the presence of other halogenated materials such as PCB with selectivities greater than 1000:1. (Holoman-Battelle)
W74-02413

HIGH PRECISION SAMPLING FOR CHROMATOGRAPHIC SEPARATIONS,
National Bureau of Standards, Washington, D.C. Analytical Chemistry Div.
For primary bibliographic entry see Field 02K.
W74-02414

EXPERIMENTAL STUDY OF THE PHASE--SELECTIVE ANODIC STRIPPING ANALYSIS OF MICROMOLAR CADMIUM (II) AT THE MICROMETER HANGING MERCURY DROP ELECTRODE IN 0.1 M POTASSIUM CHLORIDE,
Kentucky Univ., Lexington. Dept. of Chemical Engineering.
For primary bibliographic entry see Field 02K.
W74-02415

THE DETERMINATION OF PHENOLS IN AQUEOUS EFFLUENTS,
British Coke Research Association, Chesterfield (England).
R. L. Cooper, and K. C. Wheatstone.
Water Research, Vol 7, No 9, p 1375-1384, September 1973. 5 fig, 5 tab, 20 ref.

Descriptors: *Phenols, Effluents, *Separation techniques, *Pollutant identification, *Industrial wastes, *Liquid wastes, Chemical analysis, Drainage water, Organic compounds, Waste water (Pollution), Solvent extractions, Methodology, Colorimetry, Water analysis, *Gas chromatography.
Identifiers: Flame ionization gas chromatography, Cresol, Xylenols, Dihydric phenols, Ethylphenols, Monohydric phenols, Detection limits, Organic solvents, Methyl isobutyl ketone, Gas liquid chromatography, Coke oven effluents, Trimethylsilyl ethers, o-Cresol, m-Cresol, p-Cresol, o-Ethylphenol, 2 5-Xylenol, m-Ethylphenol, 2 4-Xylenol, 3 5-Xylenol, p-Ethylphenol, 2 6-Xylenol, 2 3-Xylenol, 3 4-Xylenol, Catechol, 2 3 5-Trimethylphenol, 2 4 5-Trimethylphenol, 2 4 6-Trimethylphenol, 4-Methylcatechol, 2 3 6-Trimethylphenol.

A method is described for the determination of monohydric and dihydric phenols in aqueous effluents. The phenols were extracted into methyl isobutyl ketone, the trimethylsilyl ethers prepared, separated by gas-liquid chromatography and detected by a flame ionization detector. Complete separation of phenol, cresols, xylenols, ethylphenols and dihydric phenols was achieved using dual stainless steel columns packed with Chromosorb W (AW-DCMS) coated with 5 percent tri-2,4-xylenyl phosphate and by linear temperature programming from 75 C to 125 C at 1.5 C/min; concentrations down to 0.1 mg/l of each phenol in the original sample could be determined. The results obtained by the gas chromatographic method were compared with those using standard colorimetric methods of analysis for carbonization effluents arising from different sources. The method is generally applicable to wastes containing phenols. (Holoman-Battelle)
W74-02417

ORGANIC DESORPTION FROM CARBON-II. THE EFFECT OF SOLVENT IN THE DESORPTION OF PHENOL FROM WET CARBON,
Missouri Univ., Rolla. Graduate Center for Materials Research.
R. H. Pahl, K. G. Mayhan, and G. L. Bertrand.
Water Research, Vol 7, No 9, p 1309-1322, September 1973. 7 fig, 3 tab, 11 ref.

Descriptors: *Phenols, *Activated carbon, Methodology, *Separation techniques, *Aqueous solutions, Adsorption, Solvent extractions, Moisture content, Pollutant identification, Sorption, Water, Freeze drying, Spectrophotometry, Physical properties, Thermodynamics, Organic compounds, Pollutants.
Identifiers: *Desorption, *Organic solvents, Pollutant removal, Wet carbon, *Inorganic solvents, Heat of solution, Benzene, Cyclohexane, Acetonitrile, Dodecyl alchol, Methyl alcohol, Diozane, Cellosolve acetate, Tetrahydrofuran, Dimethylformamide, Molar absorptivity, Thermogravimetric analysis, Continuous flow system, Soxhlet extraction, Ultraviolet spectrophotometry, Calorimetry, Heat of formation.

The desorption of phenol from active carbon was studied using cyclic and continuous flow desorbers. The absorptivity index of phenol in each of 10 solvents was determined by spectrophotometry using a set of standard solutions of phenol in each solvent. Phenol was adsorbed onto the carbon in a polyethylene container; and the carbon was separated from solution by filtration. The damp carbon was placed in flasks, frozen, and vacuum-dried. After 36-48 h the flasks were removed,

weighted, and the 'dry' carbon stored. Final drying was done by freeze drying and confirmed by thermogravimetric analysis. A Soxhlet extraction apparatus was used to desorb phenol from carbon using methanol, acetonitrile and cyclohexane. A continuous flow desorber constructed from a modified Soxhlet extractor was used so that all the solvents could be used under identical flow and temperature conditions. The heat of solution of phenol in methanol, dodecyl alcohol, acetonitrile and cellosolve acetate was determined using the calorimeter and experimental procedure described by Betrand, Beaty and Burns (1968). A wide difference in desorption capabilities was shown among the 10 solvents. The system employed was complex, with water being present in addition to phenol in the carbon. An attempt to correlate the desorption data with the physical properties of the phenol and solvent and regular solution theory is made. A thermodynamic approach using the linear free energy-enthalpy relationship produced a reasonable correlation of the heat of formation of the phenol-solvent hydrogen bond with the desorption data. This indicated that the desorption of the phenol from carbon in this complex system is dependent upon the ability of the solvent to form hydrogen bonds with the phenol. (See also W74-02419) (Holoman-Battelle)
W74-02418

ORGANIC DESORPTION FROM CARBON-II. THE EFFECT OF SOLVENT IN THE DESORPTION OF PHENOL FROM DRY CARBON,
Missouri Univ., Rolla. Graduate Center for Materials Research.
W. W. Knickmeyer, K. G. Mayhan, and G. L. Bertrand.
Water Research, Vol 7, No 9, p 1323-1330, September 1973. 2 fig, 7 tab, 2 ref.

Descriptors: *Activated carbon, *Adsorption, Methodology, *Phenols, *Separation techniques, Pollutant identification, Sorption, Thermodynamics, Solvent extractions, Water, Organic compounds, Pollutants, Physical properties.
Identifiers: *Desorption, Pollutant removal, Continuous flow system, *Dry carbon, Heat of solution, Heat of formation, Heat of wetting, Organic solvents, Molar absorptivity, Ultraviolet spectrophotometry, Dimethylformamide, 1 4-Dioxane, Acetonitrile, Tetrahydrofuran, Cyclohexane, Cellosolve acetate, Methyl alcohol, Benzene, Chloroform, Dodecane, Inorganic solvents, n-Pentane.

The desorption of phenol from active carbon was studied using a continuous flow desorber. The system used was nearly water free to reduce water-phenol interactions. An attempt to correlate the desorption data with the physical properties of phenol and solvents, in addition to regular solution theory, proved unsuccessful. A thermodynamic approach using the linear free energy-enthalpy relationship produced a general trend by using the heat of solution for phenol in solution and a reasonable correlation using the heat of formation of the phenol-solvent hydrogen bond with the desorption data. (See also W74-02418) (Holoman-Battelle)
W74-02419

THE DISTRIBUTION OF TRACE METALS AND FAUNA IN THE FIRTH OF CLYDE IN RELATION TO THE DISPOSAL OF SEWAGE SLUDGE,
Imperial Coll. of Science and Technology, London (England). Applied Geochemistry Group.
For primary bibliographic entry see Field 05B.
W74-02420

AN AUTOMATED ANALYSIS FOR UREA IN SEAWATER,
Oregon State Univ., Corvallis. School of Oceanography.
J. M. DeManche, H. Curl, Jr., and D. D. Coughenower.
Limnology and Oceanography, Vol 18, No 4, p 686-689, July 1973. 1 fig, 6 ref.

Descriptors: *Ureas, *Automatic control, Methodology, *Seawater, *Pollutant identification, Water analysis, Chemical analysis, Nitrogen compounds, Organic compounds, Saline water.
Identifiers: Technicon Autoanalyzer, Sensitivity, Detection limits, Precsion.

An automated method adapted to a Technicon Auto Analyzer has been used to determine urea in seawater. In the flow system for automated analyses, a sample rate of 12/hr with a sampling time of 4.5 min and a 0.5 min wash gave good results. The sensitivity of the method with the 50-mm flow cell used was 0.018 absorbance units/(microgram-atoms urea-N)/liter. Ten replicate samples of 1.0 and 3.0 microgram-atoms urea-N/liter had standard deviations of 0.019 and 0.017 and a lower limit of detection less than 0.1 microgram-atom. For most precise measurements at low levels, the limit of detection is less than 0.05 microgram-atom urea-N/liter. Beer's law was found to apply over the range of 0-10 microgram-atoms urea-N/liter. The method was used to measure urea in seawater samples collected on cruise C72091 of the RV Cayuse to the Inside Passage of Southeast Alaska in October 1972. The lowest value was 0.25 microgram-atom urea-N/liter and the highest 2.20. The median value for 308 samples taken at depths from 1 to 200 m was 0.59. The automated method is rapid and sensitive enough to measure in situ urea concentrations before enrichment with N-labeled urea in nitrogen uptake experiments, eliminating the problems reported by McCarthy (1972). (Holoman-Battelle)
W74-02421

MERCURY IN FISH, SEDIMENTS, AND WATER IN LAKE OAHE, SOUTH DAKOTA,
Environmental Protection Agency, Kansas City, Mo. Region VII.
C. M. Walter, F. C. June, and H. G. Brown.
Journal Water Pollution Control Federation, Vol 45, No 10, p 2203-2210, October 1973. 1 fig, 3 tab, 10 ref.

Descriptors: *Mercury, Freshwater fish, *Lake sediments, Water analysis, *Pollutant identification, Chemical analysis, Heavy metals, Methodology, Water sampling, Bottom sampling, Tailwater, Walleye, Sauger, White bass, Yello perch, Channel catfish, Carp, Soil analysis, Aquatic soils, *Spectrophotometry, *South Dakota.
Identifiers: Flameless atomic absorption spectrophotometry, *Lake Oahe (So. Dak), Lake Sharpe (So. Dak.), Sample preparation, Chemical recovery, Cheyenne River, Animal tissues, Background levels, Northern pike, Esox lucius, Stizostedion vitreum vitreum, Sauger, Stizostedion canadense, Morone chrysops, Perca flavescens, White crappie, Pomoxis annularis, Black crappie, Pomoxis nigromaculatus, Foster Bay, Fishgut Creek, Oak Creek, Agency Creek, Whitlocks Bay, Blue Blanket Creek, Grand River, Spring Creek, Ruby Creek.

Analyses for total mercury content were made of fish, sediment, and water samples collected in several locations in Lake Oahe, South Dakota, and its tailwaters. Preparation of fish samples for Gh analysis consisted of thawing frozen specimens, removal of a portion of the flesh, and rigorous chemical digestion. The concentration of total Hg in the sample was determined by the Hatch and Ott flameless atomic absorption method using a Hg analyzer coupled to stripchart recorder. A total of 43 sediment samples was collected, placed in polyethylene bags and frozen. Subsamples were digested, diluted to a 500-ml volume, and analyzed for Hg content as above. Water samples were also analyzed as above. Mercury concentrations equal to or exceeding 0.5 mg/kg occurred in 30 of 225 fish samples tested (13 percent). Higher concentrations were found most frequently in predatory game fishes, primarily northern pike and walleye, from the Cheyenne River arm. Sediment samples with mercury concentrations above 0.5 mg/kg were found only in the Cheyenne River arm, but water samples contained only neglibible amounts of mercury. Recommendations for further studies are presented. (Holoman-Battelle)
W74-02423

SALINITY CORRECTIONS FOR DISSOLVED OXYGEN MEASUREMENTS,
National Oceanographic Instrumentation Center, Washington, D.C.
B. S. Pijanowski.
Environmental Science and Technology, Vol 7, No 10, p 957-958, October 1973. 4 fig, 1 ref.

Descriptors: *Salinity, *Dissolved oxygen, *Measurement, *Water temperature, Methodology, Pollutant identification, Compensation.
Identifiers: Correction factors.

Presented is a convenient method of compensating for the effects of salinity on the data acquired from dissolved oxygen meters. The basic design of most of these instruments does not include provision for salinity compensation or, at best, uses a fixed value. The need for a general method of compensation is emphasized, particularly when such meters are to be used in estuarine studies. The correction technique is based on earlier work by Gilbert et al. and is presented in a form suitable for development by computer for specific instruments. Illustrations demonstrating the methodology include curves for a meter intended basically for use in freshwater as well as for another which employs a fixed value of salinity compensation. The correction factors are dimensionless and can be applied to correct dissolved oxygen values in units of either ppm or ml/1. (Holoman-Battelle)
W74-02424

TOXAPHENE ACCUMULATION IN FISH IN LAKES TREATED FOR ROUGH FISH CONTROL,
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 05C.
W74-02425

OCCURRENCE OF HEXACHLOROPHENE AND PENTACHLOROPHENOL IN SEWAGE AND WATER,
Oregon State Univ., Corvallis. Dept. of Agricultural Chemistry.
D. R. Buhler, M. E. Rasmusson, and H. S. Nakaue.
Environmental Science and Technology, Vol 7, No 10, p 929-934, October 1973. 4 fig, 5 tab, 8 ref.

Descriptors: *Water analysis, *Gas chromatography, *Mass spectrometry, *Pollutant identification, *Sewage, Chemical analysis, Phenolic pesticides, Chlorinated hydrocarbon pesticides, Water sampling, Sewage effluents, Water pollution, Waste water (Pollution), Fungicides, Antibiotics (Pesticides), Sewage treatment, Radioactivity techniques, Efficiencies, Bactericides.
Identifiers: *Hexachlorophene, *Pentachlorophenol, Sample preparation, Chemical recovery, Pollutant removal, Influents, Composite samples, Slimicides, Electron capture gas chromatography, Willamette River, Thin layer chromatography, Methylation, Chlorinated hydrocarbons.

Concentrations of hexachlorophene (HCP) and pentachlorophenol (PCP) in sewage and water samples have been analyzed by gas chromatography. Sewage influent or effluent or river water samples were acidified with 4 N H2SO4 and extracted three times with chloroform. The

chloroform extracts were dried with anhydrous Na2SO4 and evaporated to dryness in vacuo at 20C to minimize any losses of volatile components. The residues were dissolved in CH2Cl2-methanol (5:1), ethereal diazomethane added, and the mixtures allowed to stand for 30 min at room temperature. After methylation, and samples were evaporated to dryness in a stream of N2, redissolved in benzene, dried with Na2SO4, made up to 5 ml analyzed. HCP and PCP levels in 24-hr composite samples of sewage influent collected simultaneously from three Oregon cities ranged between 20-31 ppb and 1-5 ppb, respectively. Composite effluent values from these same sewage treatment plants were 6-12 ppb HCP and 1-4 ppb PCP, reflecting a 60-70 percent removal of HCP and a 4-28 percent removal of PCP. Analyses of daily and hourly water samples from the Willamette River collected just upstream from the city of Corvallis, Oregon, showed that HCP and PCP were present in river water in concentrations varying between 0.01-0.1 ppb and 0.10-0.70 ppb, respectively. Conventional processing of raw Willamette River water at the Corvallis Taylor water treatment plant removed about 60 percent of the HCP and PCP originally present in the water leaving about 40 percent of these chlorophenols in the finished drinking water. Identifications of HCP and PCP in sewage effluent and influent, Willamette River water and treated drinking water were confirmed by mass spectrometry. (Holoman-Battelle)
W74-02426

DETECTION AND ESTIMATION OF ISOPROPYL METHYLPHOSPHONOFLUORIDATE AND O--ETHYL S-DIISOPROPYLAMINOETHY-LMETHYLPHOSPHONOTHIOATE IN SEA-WATER IN PARTS-PER-TRILLION LEVEL,
Edgewood Arsenal, Aberdeen Proving Ground, Md.
H. O. Michel, E. C. Gordon, and J. Epstein.
Environmental Science and Technology, Vol 7, No 11, p 1045-1049, November 1973. 7 tab, 9 ref.

Descriptors: Estimating, *Seawater, *Pollutant identification, *Water analysis, Poisons, Chemical reactions, Organic compounds, Water pollution, Inhibitors, Chemical analysis, Sodium chloride, Hydrogen ion concentration, Temperature, Water sampling, Hydrolysis.
Identifiers: Nerve gas, *Trace levels, *Anticholinesterases, *Enzymatic techniques, Enzymatic inhibitors, Isopropyl methylphosphonofluoridate, Acetylcholinesterase, Substrate concentration, Butyryl cholinesterase, Acetylcholine, Acetylthiocholine, Phenylacetate, rhonitro Phenylacetate, Mixtures, 2 6-di Cl indophenolacetate, Indoxylacetate, O-ethyl S-diisopropylaminoethyl-methlphosphonothioate, Sensitivity, Substrates.

A procedure is described for the estimation of two very potent anticholinesterase chemicals, viz., isopropyl methylphosphonofluoridate and O-ethyl S-diisopropylaminoethlmethylphosphonothioate in seawater in concentrations at the parts-per-trillion level by an enzymatic technique. Kinetic constants for the reaction of other anticholinesterases with two sources of cholinesterase and for the reaction of the cholinesterases with several substrates are given. With these data, the reader can select conditions for the development of procedures for estimating very low concentrations of these anticholinesterases in water. (Holoman-Battelle)
W74-02427

COMPARING THE QUALITY OF OUR WATERS,
Orlando Labs., Inc., Fla.
J. J. Hobbs, G. Medina, and A. Dillon.
Pollution Engineering, Vol 5, No 10, p 42-43, October 1973. 1 fig, 1 tab.

Descriptors: *Water quality, *Water chemistry, *Water properties, Rivers, Lakes, Streams, Water analysis, Chemical analysis, Bays, Springs, Lake Ontario, Lake Michigan, Lake Erie, Lake Huron, Lake Superior, Hudson River, Chesapeake Bay, Freshwater, Dissolved solids, Alkalinity, Carbonates, Bicarbonates, Alkalis (Bases), Carbon dioxide, Chlorides, Sulfates, Fluorides, Phosphates, Hydrogen ion concentration, Stability, Saturation.
Identifiers: *Natural waters, Seine River, Rappahannock River, Bay of Fundy, Cape Cod Bay, Norris Dam Lake, Glapagos Islands, South James Bay Spring, Total organic carbon.

Many extensive studies are now being conducted throughout the world on the quality of water in rivers, lakes and streams. Analyses of grab samples collected from a number of major bodies of water are presented in tabular form. It is important to note that grab sample results are of value only when related to a number of collection factors. The analysis of these samples is for the purpose of general information only. (Holoman-Battelle)
W74-02428

POTENTIALITY OF THE COUPLING OF COLUMN LIQUID CHROMATOGRAPHY AND FIELD DESORPTION MASS SPECTROMETRY,
Bonn Univ. (West Germany). Institut fuer Physikalische Chemie.
For primary bibliographic entry see Field 02K.
W74-02430

SEPARATION AND GAS-CHROMATOGRAPHIC DETERMINATION OF TRACES OF FLUORIDE, (ABTRENNUNG UND GAS-CHROMATOGRAPHISCHE BESTIMMUNG VON FLUORIDSPUREN),
Mainz Univ. (West Germany). Institut fuer Anorganische Chemie und Kernchemie.
R. Bock, and S. Strecker.
Zeitschrift fur Analytische Chemie, Vol 266, No 2, p 110-116, July 23, 1973. 8 fig, 10 tab, 9 ref.

Descriptors: *Fluorides, *Aqueous solutions, *Chemical analysis, *Separation techniques, Pollutant identification, Solvent extractions, *Gas chromatography, Chemical reactions, Chemical precipitation, Absorption.
Identifiers: *Trace levels, Flame ionization gas chromatography, Detection limits, Organic solvents, m-Xylene, Coprecipitation, Methylene chloride, Tetraphenyl antimony hydroxide, Triethyl silicon fluoride.

Traces of fluoride can be separated from aqueous solution by extraction with (C2H5)3SiCl in m-xylene or with (C6H5)4SbOH in CH2C12. Furthermore, several coprecipitation reactions were tested; absorption on hydroxyl apatite is most suitable. Determination of 0.05 microgram fluoride/ml can be performed by gas chromatography of (C2H5)3SiF in m-xylene using flame ionisation detectors; but variable blanks of 0.5-1.5 micrograms fluoride normally prevent the determination of less than ca. 3 micrograms fluoride. (Holoman-Battelle)
W74-02431

ANIONIC EXCHANGE SEPARATIONS OF THE ELEMENTS THAT CAN BE EXTRACTED WITH TRIBUTYL PHOSPHATE. II, (ANIONENAUSTAUSCHTRENNUNGEN DER MIT TRIBUTYLPHOSPHAT EXTRAHIERBAREN ELEMENTE. II),
Vienna Univ. (Austria). Analytisches Institut.
For primary bibliographic entry see Field 02K.
W74-02432

APPLICATION OF ACTIVATED CARBON FOR THE ENRICHMENT OF TRACE ELEMENTS AND THEIR DETERMINATION BY ATOMIC ABSORPTION SPECTROMETRY, (UBER DIE VERWENDUNG VON AKTIVKOHLE ZUR ANREICHERUNG VON SPURENELEMENTEN MIT NACHFOLGENDER BESTIM MUNG DURCH ATOMABSORPTIONS-SPEKTROMETRIE,
Institut fuer Spektrochemie und Angewandte Spektroskopie, Dortmund (West Germany).
E. Jackwerth, J. Lohmar, and G. Wittler.
Zeitschrift fur Analytische Chemie, Vol 266, No 1, p 1-8, July 3, 1973. 1 fig, 4 tab, 14 ref.

Descriptors: *Trace elements, *Activated carbon, *Aqueous solutions, *Chemical analysis, Heavy metals, Separation techniques, Solubility, Pollutant identification, Methodology, *Spectrophotometry.
Identifiers: Atomic absorption spectrophotometry, Enrichment, *Sample preparation, Metal chelates.

Activated carbon can be used as collector material in trace analysis. Due to the special character of activated carbon, not only insoluble compounds can be enriched, but also many soluble chelate complexes of trace elements. For that purpose the buffered aqueous solution of the analytical sample containing complexing or precipitating reagents is filtered through a small filter paper covered with 50 mg of activated carbon. The trace compounds, and in many cases also the surplus reagent are adsorbed by the collector. By treating the carbon collector with acid after the process of trace enrichment, a trace concentrate free of unwanted substances is obtained. Thus it is possible to use sensitive electrochemical and optical methods for the determination. For the determination of the enriched elements by atomic absorption spectrometry, the activated carbon suspended in diluted nitric acid can be dispersed directly into the atomizer. The carbon particles do not cause any interferences. The application and the advantages of activated carbon for enrichment of trace elements in high-purity materials is demonstrated by some analytical examples. (Holoman-Battelle)
W74-02433

DETERMINATION OF SMALL AMOUNTS OF URANIUM AFTER CONCENTRATING THROUGH EXTRACTION AND ANIONIC EXCHANGE IN A SOLVENT AGENT SYSTEM CONTAINING TRI-N-OCTYLPHOSPHINE OXIDE. (BESTIMMUNG GERINGER URANMENGEN NACH KONZENTRIERUN G DURCH EXTRAKTION UND ANIONENAUSTAUSCH IN EINEM TRI-N-OCTYLPHOSHINOXIDHALTIGEN LOSUNGSMITTELSYSTEM),
Vienna Univ. (Austria). Analytisches Institut.
J. Korkisch, and W. Koch.

Descriptors: *Separation techniques, *Pollutant identification, Solvent extractions, Anion exchange, Methodology, Fluorometry, Spectrophotometry, Molybdenum, Heavy metals.
Identifiers: *Uranium, Tri-n-octylphosphine oxide, *Solvent systems, Preconcentration, Ionic interference, Ion exchange resins, Organic solvents.

A method has been developed for the separation of uranium that is based on systematic studies of the behavior of uranium in various water-organic solvent systems containing tri-n-octylphosphine oxide (TOPO) towards various anion forms of the strongly basic anion exchanger Dowex 1,X8. In this procedure, the uranium is extracted from a 1 N hydrochloric acid solution containing ascorbic acid into diethyl ether and adsorbed from a mixture consisting of 50 vol. percent ether (0.1 N in TOPO), 45 vol. percent methylglycol and 5 vol. percent 12 N hydrochloric acid on the ic exchanger (chlorid form). Following elution with 1 M hydrochloric acid, the uranium is determined either fluorimetrically or spectrophotometrically by the thiocyanate method. By means of this anion exchange procedure, it is possible above all to separate the uranium from all ions interfering with

its fluorimetric or spectrophotometric determination and also from TOPO itself. In particular, consideration is given to the spectrophotometric determination of the uranium in the presence of larger amounts of molybdenum, and a method was worked out for the removal of this element. (Holoman-Battelle)
W74-02434

A COMPARISON OF THE CONTENT OF MICROELEMENTS IN THE WATER OF THE RIVER DANUBE NEAR VIENNA AND BELGRADE FOR 1961-1970 (EIN VERGLEICH DES GEHALTES AN SPURENELEMENTEN IM DONAUWASSER BEI WIEN UND BEOGRAD FUE 1961-1970),
Bundesanstalt fuer Wasserbiologie und Abwasserforschung, Vienna (Austria).
Von A. Frantz, R. J. Draskovic, T. Tasovac, R. Radosavljevic, and G. Petrovic.
Archiv fur Hydrobiologie, Suppl. 44, No 2, p 258-262, March 1973. 2 fig, 1 tab, 4 ref.

Descriptors: *Water analysis, *Chemical analysis, *Neutron activation analysis, *Pollutant identification, Heavy metals, Time, Chromium, Iron, Cobalt, Sodium, Spatial distribution, Temporal distribution, Alkali metals.
Identifiers: *Danube River, Scandium, Antimony, Lanthanum, Rare earth elements.

The Federal Institute of Hydrobiology and Waste Water Research in Vienna, Austria, and the Boris Kidric Institute of Nuclear Sciences in Belgrade, Yugoslavia, started systematic investigations of the River Danube to determine the amount of microelements by means of neutron activation analysis in dependence of place and time. Results of 1961-1970 are presented. (Holoman-Battelle)
W74-02436

NATURE AND STABILITY OF COMPLEX MERCURY COMPOUNDS IN SURFACE AND GROUND WATERS,
Auburn Univ. Ala. Dept. of Chemistry.
J. E. Land, W. R. Mountcastle, H. T. Peters, and D. R. Holt.
Available from the National Technical Information Service as PB-226 226 $3.50 in paper copy, $1.45 in microfiche. Alabama Water Resources Research Institute Auburn Bulletin 17, 1973. 46 p, 3 fig, 4 tab, 3 append. OWRR A-028-ALA (1).

Descriptors: Water pollution, Groundwater, Chemical properties, *Mercury, *Pollutant identification, *Ions, *Electrodes.
Identifiers: *Methylmercury Compounds.

Attempts to determine the stability constants for the methylmercury phosphato and diphosphato complexes at 25C in an aqueous media and with an ionic strength of 0.10 M (with KNO3) through the use of electromotive force measurement and half-wave potentials from the dropping mercury electrode are described. No positive results were recorded using a chloride selective ion electrode; however, a glass-nitrate selective ion electrode combination yielded reproducible and meaningful values when a solution of the ligand and methylmercury ion were titrated with standard nitric acid. Calculations of stability constants proved to be impossible since the quoted constants for the hydrolysis of the methylmercury cation are apparently in error, and corrective efforts are outlined. Reduction waves of the methylmercury chloride and hydroxide species in solution are presented and explained by postulated mechanisms involving free radical intermediates.
W74-02441

A MASS BALANCE MODEL OF TRACE METALS IN SEVERAL DELAWARE WATERSHEDS,
Delaware Univ., Newark. Coll. of Marine Studies.
For primary bibliographic entry see Field 05B.
W74-02443

HEAVY METALS IN THE MAIN STREAMS OF THE JAMES RIVER BASIN, MISSOURI,
Missouri Water Resources Research Center, Rolla.
P. D. Proctor, and R. J. Lance.
Available from the National Technical Information Service as PB-226 253 $3.50 in paper copy, $1.45 in microfiche. Completion Report, August 29, 1973. 60 p, 21 fig, 5 tab, 30 ref, append. OWRR A-066-MO- (1).

Descriptors: *Missouri, *Heavy metals, Streams, Seasonal, Geology, Mineralization, Physical properties, Cadmium, Copper, *Lead, *Zinc, Iron, Hydrogen ion concentration, Temperature, Alkalinity, Specific conductivity, Mercury, Mining.
Identifiers: *James River (Mo.).

Demand for water in the James River basin has greatly increased. Larger numbers of industrial plants and the presence of lead-zinc prospects in the basin are potential sources of heavy metal additions to the waters of the area. This study determines selected heavy metal content and distribution in the streams of the basin and establishes some heavy metal bench mark values for this time period. Approximately 50 water samples were collected in each of three seasons. These samples were analyzed by atomic absorption techniques. Temperature, specific conductance, pH, and effective alkalinity were measured in the field. Ranges of heavy metal content were: (1) mercury-greater than 0.1-0.3 ppb (summer only); (2) zinc-less than-80 ppb; (3) copper-less than 1-18 ppb; (4) lead-less than 1-41 ppb; (5) cadmium-less than 1-7 ppb; and (6) iron-less than 50-277 ppb. The urban areas of Springfield contribute dissolved heavy metals to the surface streams. The Southwest Springfield Sewage Treatment Plant is not a significant source. Seasonal and geographic variations are also apparent. Heavy metal contributions appear to be related to mineralized and faulted areas in the basin. Variation of heavy metals at individual sample sites is not considered of great significance. Filtered water samples meet PHS heavy metal standards for public drinking water.
W74-02445

NITROGEN, PHOSPHORUS, AND TRACE ELEMENTS IN FLORIDA SURFACE WATERS, 1970-71,
Geological Survey, Tallahassee, Fla.
B. F. Joyner.
Open-file report 73 028, 1973. 30 p, 1 fig, 2 tab, 6 ref.

Descriptors: *Nitrogen, *Phosphorus, *Trace elements, *Surface waters, *Florida, Sampling, Water analysis, Chemical analysis, Analytical techniques, Data collections, Rivers, Streams, Lakes, Estuaries, Water pollution.

Nitrogen, phosphorus, and trace-element data are summarized for samples collected at 99 selected surface water stations in Florida in 1970-71. The data were collected in cooperation with many state, county, local, and federal agencies. The network stations were selected to provide water-quality information on (1) the major stream systems in Florida under differing hydrologic regimens, (2) streams either little affected or greatly affected by man's activities, (3) lakes either little affected or greatly affected by man, (4) streams with high organic color, (5) selected major springs and (6) selected estuaries. The locations of the stations are shown on a map. The field and laboratory determinations are tabulated. Also given are sample collection procedures, sample preservation, and laboratory analytical methods. (Woodard-USGS)
W74-02476

SYSTEM FOR MONITORING CONTAMINANTS IN LIQUIDS,
F. J. Bogusz.
U. S. Patent No. 3,762,214, 3 p, 4 fig, 4 ref; Official Gazette of the United States Patent Office, Vol 915, No 1, p 72, October 2, 1973.

Descriptors: *Patents, *Water quality, *Pollutants, *Monitoring, Data processing, *Water pollution.
Identifiers: *Sensors, Electrical equipment.

A water pollution monitoring system is provided which may be coupled with data handling and processing equipment. Levels of pollutants are detected by means of sensors and an electrical signal corresponding to the pollutant level is processed for recording and/or transmission. Means are provided for automatic periodic cleaning of the sensors so that a high level of accuracy can be maintained for an extended period of time. A variety of signal conditioning circuits as well as the limit alert module, data sampling devices and an ultrasonic transducer are located within a water-tight compartment of the systems container. The data sampling sequencer may be switched into the data acquisition channels to systematically sequentially sample the various parameters of the media being monitored. A reference pulse is provided to allow a data analyst to determine and correlate the data with respect to the various sensors. (Sinha-OEIS)
W74-02493

REMOTE DETECTION OF AEROSOL POLLUTION BY ERTS,
Old Dominion Univ., Norfolk, Va. Dept. of Geophysical Sciences.
For primary bibliographic entry see Field 07B.
W74-02575

WATER TURBIDITY DETECTION USING ERTS-1 IMAGERY,
Geological Survey, Lawrence, Kans.
For primary bibliographic entry see Field 07B.
W74-02582

POLLUTED AND TURBID WATER MASSES IN OSAKA BAY AND ITS VICINITY REVEALED WITH ERTS-A IMAGERIES,
Kyoto Gakuen Univ. (Japan).
For primary bibliographic entry see Field 07B.
W74-02586

5B. Sources of Pollution

A STUDY OF FACTORS INFLUENCING THE NITROGEN AND PHOSPHORUS CONTENTS OF NEBRASKA WATERS,
Nebraska Univ., Lincoln. Dept. of Agronomy.
J. Muir, E. C. Seim, and R. A. Olson.
Journal of Environmental Quality, Vol 2, No 4, p 466-470, October-December 1973. 1 fig, 5 tab, 14 ref.

Descriptors: *Water pollution sources, *Nitrogen, *Phosphorus, *Nebraska, Fertilizers, Leaching, Farm wastes, Waste disposal, Irrigation.

The magnitudes and sources of nutrient N and P in Nebraska waters were determined. There is little relation between N and P concentrations of the water and agricultural use of fertilizers. Nutrient levels in the water are governed more by human and livestock densities and intensity of irrigation development than by agronomic production factors. Only at sites of intensive irrigation development on very sandy soils and with irrigation of valley positions of shallow water table has fertilizer N contributed substantially to a reduction in groundwater quality. Nutrient concentrations in streams fluctuate widely with varied time and rate of organic waste intrusions and subsequent biological

assimilation and with major runoff events. Reservoirs on streams also have a major modifying action in reducing sediment and fertility load. The observed higher N content of streams during periods of peak flow can be attributed partially to the high N content of precipitation and its direct runoff into streams during periods of high rainfall intensity. (Knapp-USGS)
W74-02151

AGRICULTURAL CHEMICALS IN SURFACE RUNOFF, GROUND WATER, AND SOIL: 1. ENDRIN,
Agricultural Research Service, Baton Rouge, La.
G. H. Willis, and R. A. Hamilton.
Journal of Environmental Quality, Vol 2, No 4, p 463-466, October-December 1973. 4 tab, 11 ref.

Descriptors: *Path of pollutants, *Endrin, Pesticide kinetics, Chlorinated hydrocarbon pesticides, Runoff, Water pollution sources, Soil water, Groundwater, *Agricultural chemicals.

Endrin was applied at a rate of 0.337 kg/ha to sugarcane plots instrumented to sample surface runoff and groundwater. Runoff, groundwater, and soil samples were collected over a 2-year period and analyzed for endrin. Only small amounts of endrin were lost annually in runoff (less than 0.2% of that applied), and little endrin accumulated in soil. Trace amounts of endrin appeared to move through soil in the plots but not through soil columns. A delay of 72 hours between application and rainfall decreased the amount of endrin in runoff, groundwater, and soil. (Knapp-USGS)
W74-02152

MINIMIZING NITRATE SEEPAGE FROM THE HULA VALLEY INTO LAKE KINNERET (SEA OF GALILEE): 1. ENHANCEMENT OF NITRATE REDUCTION BY SPRINKLING AND FLOODING,
Technion-Israel Inst. of Tech., Haifa. Soils and Fertilizers Lab.
A. Raveh, and Y. Avnimelech.
Journal of Environmental Quality, Vol 2, No 4, p 455-458, October-December 1973. 3 fig, 4 tab, 11 ref.

Descriptors: *Nitrates, *Leaching, *Water pollution control, *Sprinkler irrigation, Flooding, Denitrification, Organic soils, Water pollution sources, *Path of pollutants.
Identifiers: *Israel (Hula Valley).

Decomposition of organic matter in the drained soils of the Hula Valley, Israel, leads to the accumulation of nitrates. These are leached during the rainy season to the Jordan River and endanger Lake Kinneret. Field studies show that nitrates can be reduced through the use of the irrigation systems existing in the area. Either sprinkling or flooding by raising the water table reduced the nitrate concentration to about half of its original amount. Both treatments induced anaerobic conditions in the soil and reduced the nitrate contents, probably by dentrification. The efficiency of the reduction depends on the existence of labile organic substrates in the soil. (Knapp-USGS)
W74-02153

PLANT NUTRIENT CONCENTRATIONS IN RUNOFF FROM FERTILIZED CULTIVATED EROSION PLOTS AND PRAIRIE IN EASTERN SOUTH DAKOTA,
South Dakota State Univ., Brookings. Dept. of Soils.
E. M. White, and E. J. Williamson.
Journal of Environmental Quality, Vol 2, No 4, p 453-455, October-December 1973. 3 tab, 6 ref.

Descriptors: *Nutrients, Runoff, *Fertilizers, *Erosion, *Grasslands, Water pollution sources, *Path of pollutants, *South Dakota, Agriculture.

Runoff waters from fertilized erosion plots and from native prairie in South Dakota were compared to determine the effect agriculture has had on water quality. Calcium, Mg, K, Na, total P, PO4-P, NO3-N, and NH4-N contents were found to be similar in runoff from the erosion plots and from the prairie. The elemental contents in runoff from erosion plots planted to oats, corn, and alfalfa or fallowed were not distinctly different and varied from year to year. Variations in the ions in water collected from different basins in the prairie may be caused by differences in the prairie vegetation and mulch in the drainage basins, in the time the runoff has to dissolve ions because of different overland flow distances, and in the dilution of the runoff by precipitation that falls directly into the basin. Losses of plant nutrients in soil eroded from cultivated land may be similar to average losses that would occur naturally if the area were in pristine prairie that was periodically subjected to fire. (Knapp-USGS)
W74-02154

SIGNIFICANCE OF PH AND CHLORIDE CONCENTRATION ON BEHAVIOR OF HEAVY METAL POLLUTANTS: MERCURY (II), CADMIUM (II), ZINC (II), AND LEAD (II),
Soil and Irrigation Research Inst., Pretoria (South Africa).
H. C. H. Hahne, and W. Kroontje.
Journal of Environmental Quality, Vol 2, No 4, p 444-450, October-December 1973. 10 fig, 4 tab, 17 ref.

Descriptors: *Heavy metals, *Hydrolysis, *Chlorides, *Mercury, *Cadmium, *Zinc, *Lead, Solubility, Water pollution sources, Hydrogen ion concentration.
Identifiers: Complex ions.

The degrees to which Hg (II), Cd (II), and Pb (II) complex with hydroxyl and chloride ions were calculated to evaluate the significance of such complexation in natural systems. Both the hydroxy and chloride complexes may contribute to the mobilization of these heavy metal ions in the environment. Hydrolysis of Hg (II) becomes important at pH values above 1 whereas Pb (II), Zn (II), and Cd (II) hydrolyze above pH 5, 7, and 8, respectively. Chlorides complex with Hg (II) at chloride concentrations above 1 billionth M. Hydrolysis and chloride complexation of these heavy metal ions are important factors affecting the solubility of the sparingly soluble salts of these metal ions. This is most pronounced for mercuric salts. Intrinsic solubilities of the metal-ion hydroxides allow for 160 ppm Zn (II) and 107 ppm Hg (II) to be soluble as complexed Zn (OH)2 and Hg (OH)2, respectively. These values are higher than calculated solubilities based on solubility products. An example of the competition between hydroxy and chloride complexes shows that at pH 8.5 and a chloride concentration range of 350-60,000 ppm, Hg (II) and Cd (II) are mainly complexed by chlorides. Zn (II) and Pb (II), under these conditions, are predominantly in the form of hydroxy complexes. (Knapp-USGS)
W74-02155

EXPERIMENTAL AND PREDICTED MOVEMENT OF THREE HERBICIDES IN A WATER--SATURATED SOIL,
Oklahoma State Univ., Stillwater. Dept. of Agronomy.
J. M. Davidson, and J. R. McDougal.
Journal of Environmental Quality, Vol 2, No 4, p 428-433, October-December 1973. 7 fig, 1 tab, 19 ref.

Descriptors: *Path of pollutants, *Herbicides, *Saturated soils, Saturated flow, *Soil water movement, Pesticide kinetics, Dispersion, Adsorption.

The equilibrium asorption characteristics of 1,1-dimethyl-3- (a,a,a-trifluoro-m-tolyl) urea (fluometuron), 4-amino-3,5,6-trichlor-opicolinic acid (picloram), and 2,4-bis (isopropylamino)-6-(methylthio)-s-triazine (prometryne) on Ca-saturated Norge loam soil were measured and were found to fit the Freundlich equation. A solution of each herbicide was displaced through a water-saturated column of Norge loam soil at various average pore-water velocities (5.6 to 0.57 cm per hour) and effluent samples evaluated to determine the importance of adsorption kinetics to the mobility of the herbicide. The displacement of each herbicide through the soil was significantly influenced by the average pore-water velocity. The use of a kinetic adsorption model in a convective transport equation did not adequately predict the shape of the effluent concentration distribution at the high pore-water velocities, but did give the left-hand shift exhibited by the data. The tailing noted in all the herbicide effluent concentration distributions resulted primarily from the nonsingularity between the adsorption-desorption process. Equilibrium adsorption and desorption isotherms were measured for picloram on Ca-saturated Norge loam soil. (Knapp-USGS)
W74-02156

EFFECT OF FEEDLOT MANURE ON SOIL AND WATER QUALITY,
Department of Agriculture, Lethbridge (Alberta). Research Station.
T. G. Sommerfeldt, U. J. Pittman, and R. A. Milne.
Journal of Environmental Quality, Vol 2, No 4, p 423-427, October-December 1973. 3 fig, 4 tab, 19 ref.

Descriptors: *Farm wastes, *Nitrates, *Phosphorus, *Water pollution sources, *Feed lots, Soil water, Cattle, Water pollution effects, *Canada.

Research was conducted to determine the contribution of representative feedlots in semiarid southern Alberta to soil and water pollution and to determine the effect of long-term applications of manure on the N, P, and soluble salt content of cultivated soil under irrigation. The NO3-N and available P content of the surface soil adjacent to the feedlots was generally greater than that of the soil away from the feedlots, but at depths greater than 150 cm the differences were usually small. Similarly, the concentration of NO3-N and P in the groundwater at 1- to 5-m depths was usually increased only adjacent to the feedlot and, with minor exceptions, remained within safe limits most of the time. There was no evidence that a small lake or three permanent streams near feedlots were polluted by effluents from the feedlots. Manure applied annually for 40 years at a rate of 70 metric tons per ha did not cause an undesirable buildup of N, P, or soluble salts in the soil. (Knapp-USGS)
W74-02157

THE TURBULENT TEMPERATURE MIXING LAYER,
Queen's Univ., Kingston (Ontario). Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W74-02162

DISPERSION IN FLOW FROM A CONTINUOUS SOURCE AT SEA,
Liverpool Univ. (England). Dept. of Oceanography.
K. F. Bowden, and R. E. Lewis.
Water Research, Vol 7, No 11, p 1705-1722, November 1973. 9 fig, 6 tab, 21 ref.

Descriptors: *Dispersion, Diffusion, *Path of pollutants, Sea water, Dye releases, Dye dispersion, Fluorescent dye.
Identifiers: *Scotland (Holy Loch), Irish Sea.

Diffusion experiments, using a continuous release of fluorescent dye from an anchored source, were

carried out in the Holy Loch and two coastal areas of the Irish Sea. In each case the dye distribution was sampled by a vessel making a series of crossings of the plume. The data were analyzed in terms of the standard deviation of the dye distribution at right angles to the axis of the plume, as a function of the diffusion time, and the corresponding eddy diffusion coefficient. In general the diffusion coefficient increased with time up to a diffusion time of at least 2 h. In many cases the relation was approximately linear, corresponding to spreading with a constant diffusion velocity. The observed median values of diffusion velocity for the Holy Loch, Red Wharf Bay and the area of the Irish Sea off the Cumberland coast were 0.4, 1.1 and 1.4 cm per sec. The vertical diffusion was also analyzed, but in less detail, and other features of the plumes, including their variability, are discussed. In general the rates of diffusion in the Holy Loch are similar to those reported for the Great Lakes and for coastal sea areas with weak currents and high stability. In the two Irish Sea areas the diffusion rates are similar to one another but considerably greater than in the Holy Loch. (Knapp-USGS)
W74-02163

DETERMINATION OF THE MECHANICAL COMPATIBILITY OF POROUS ROCKS WITH WASTE WATER IN ITS SUBSURFACE DISPOSAL,
Ustredni Ustav Geologicky, Brno (Czechoslavakia).
M. Strnad, and D. Novotny.
Water Research, Vol 7, No 11, p 1599-1607, November 1973. 2 fig, 5 tab, 11 ref.

Descriptors: *Clogging, *Silting, *Injection wells, *Waste disposal wells, Porosity, Permeability, Particle size, Industrial wastes.

The effect of waste water suspended solids on the permeability of the disposal horizon may be determined on the basis of rock pore size distribution measurements made by means of a mercury pressure porosimeter. The results approach laboratory measurements for smaller particles, and for particles of 0.00075 cm radii they are practically coincident. The method is useful for economic calculations of surface facilities for waste water treatment. The method can also be applied to similar problems concerning the injection of water into wells for the purposes of secondary oil recovery (water flooding). (Knapp-USGS)
W74-02165

TWO ENVIRONMENTAL ANALYSES INVOLVING AGRICULTURE,
Illinois Univ., Urbana.
E. R. Swanson.
Paper presented at Ames, Iowa Workshop on Decision and Environmental Analysis held in connection with Computer Science and Statistics: Seventh Annual Symposium of the Interface, October 1973. 8 p, 2 fig, 15 ref.

Descriptors: Water quality act, *Small watersheds, *Farm wastes, *Simulation analysis, *Water reuse, *Linear programming, Optimal development plans, *Waste disposal, Watershed management, Sedimentation, Nitrates.
Identifiers: Municipal wastes disposal, Reclaimed strip mining.

Linear programming is used to analyze the impact of water quality constraints on optimal agricultural production in a small watershed. The constraints included rates of sedimentation and nitrate concentration. A second analysis deals with sludge disposal on reclaimed land. A simulation model identifies variables critical for effectiveness of the project.
W74-02166

AN INVESTIGATION OF THE PHYSICAL EFFECTS OF THERMAL DISCHARGES INTO CAYUGA LAKE,
Calspan Corp., Buffalo, N.Y.
T. R. Sundaram, C. C. Easterbrook, K. R. Piech, and G. Rudinger.
Technical Report, 74 fig, 9 tab, 141 ref, 306 p, November 1969.

Descriptors: Lakes, Powerplants, *New York, *Thermal pollution, Water pollution effects, *Lake stratification, Water pollution sources, Outlets.
Identifiers: *Cayuga Lake (N.Y.), *Thermal plume, Epilimnetic characteristics.

An analytical study of the physical effects of thermal discharges from power plants into a stratified lake are considered. Specifically, the possible physical consequences of the thermal discharges from a proposed nuclear power plant on the thermal structure of Cayuga Lake, New York are predicted. The effects of the thermal discharges are analyzed in two separate spacial and temporal scales. In the first scale, which is termed the near-field scale, the effects of the thermal discharges on the region in the immediate vicinity of the outfall are considered. The behavior of the thermal plume as a function of the changing meteorological conditions above the lake and as a function of the outfall configuration are discussed. The effects of the power-plant intake on the thermocline are also discussed. In the second scale, which is termed the far-field scale, the effects of the heated discharges on the thermal structure of the entire lake are considered. In particular, the effects of the discharges on the epilimnetic characteristics and the stratification period of the lake are given. The various transient motions (such as internal seiches) that occur in a stratified lake are also analyzed.
W74-02178

PERSISTENT SEA-FOAM MASSES -- A PROBLEM SOLVED,
Calspan Corp., Buffalo, N.Y.
R. E. Baier.
Australian Natural History, p 162, March 1972.

Descriptors: Lakes, *Foaming, Water pollution control, Water pollution sources, *New York, Eutrophication, Frothing, Surfactants.
Identifiers: *Sea-Foam Masses, *Lake Chautauqua (N.Y.).

The curious nature of the great masses of foam, which are often found drifted in from the sea onto local rocks and beaches, was researched. It was observed that these lather-like masses persisted for relatively long periods, even when blown about by the wind. In Lake Chautauqua, the proteinaceous material was found to give rise in billowing heaps of foam along the windward shore, and to have its origin in a large algae bloom. An explanation of the phenomenon of foam formation could be that during storms, large numbers of planktonic organisms were destroyed and the debris from these minute organisms lowered the water surface tension to allow it to foam and stabilized the froth once it was formed.
W74-02180

SURFACE QUALITY ASSESSMENT OF NATURAL BODIES OF WATER,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 05A.
W74-02181

CHEMISTRY OF MARINE NATURAL PRODUCTS,
Hawaii Univ., Honolulu. Dept. of Chemistry.
P. J. Scheuer.
Academic Press, New York, N.Y. 1973. 201 p.

Descriptors: *Organic compounds, *Chemistry, *Nitrogen compounds, Marine algae, Marine animals, Marine bacteria, Sea water, Amino acids, Nitrogen, Organic acids, Bioluminescence, Lipids, Phenols, Attractants, Poisons, Red tide, Sulfur compounds, Cyanophyta, Protozoa, Chlorophyta, Crustaceans, Invertebrates, Dinoflagellates, Pyrrophyta, Phaeophyta, Gastropods, Mollusks, Annelids, Snails, Clams, Rhodophyta, Copepods, Nematodes, Mammal groupings, Marine fish, Oysters, Lobsters, Coral, Marine plants, Diatoms, Chrysophyta.
Identifiers: *Isoprenoids, *Sterols, *Benzenoids, *Aliphatic hydrocarbons, *Marine environment, *Natural organics, *Chemical structure, Sesquiterpenoids, Diterpenoids, Triterpenoids, Carotenoids, Flavonoids, Biosynthesis, Naphthalene, Anthracene, Choline, Derivatives, Amines, Hydrocarbons, Fathy acids, Sponges, Antedon.

This publication is concerned with the naturally occurring organic compounds in the sea. Major emphasis has been placed on structural organic chemistry. (Holoman-Battelle)
W74-02189

ON THE RELATION BETWEEN THE OCCURRENCE OF DESMIDS AND THE SALINITY IN THE HOKURIKU DISTRICT OF JAPAN, (IN JAPANESE).
Nijo Junior High School, Kyoto (Japan).

Bull Jap Soc Phycol. Vol 20, No 3, p 101-110. 1972. Illus. (English summary).
Identifiers: Brackish water, Closterium-Parvulum, *Closterium-spp, Cosmarium-spp, *Desmids, *Japan (Hokuriku), *Salinity, Staurastrum-spp.

Five lakes and their rivers in the Hokuriku district of Japan were surveyed. The desmids of this district are composed of 5 genera and 53 spp., of which 51 belong to the genera Closterium, Cosmarium and Staurastrum. The desmids are widely distributed in fresh water, but few of them occur in brackish water of low salinity. Judging from the survey, their adaptable range chlorinity reached to 500 mg/l except that Closterium parvulum seems to tolerate about 1500 mg/l.--Copyright 1973, Biological Abstracts, Inc.
W74-02191

INFLUENCE OF SOIL STRUCTURE AND MOISTURE ON NITRIFICATION,
Komenskeho Universita, Bratislava (Czechoslovakia). Dept. of Microbiology.
For primary bibliographic entry see Field 02G.
W74-02192

CALCULATION OF DOSE CONVERSION FACTORS FOR 60CO GAMMA RADIATION IN WATER, (IN GERMAN),
International Atomic Energy Agency, Vienna (Austria).
H. H. Eisenlohr, and R. Abdelin-Zadeh.
Strahlentherapie. Vol 143, No 4, p 410-415. 1972. Illus. (English summary).
Identifiers: Calculations, *Cobalt-60, *Dose conversion, *Gamma radiation, Water pollution sources.

The dose conversion factors, f and g, and the water-air-ratio were calculated for 60Co gamma radiation and water as a ratio of the corresponding depth-doses. Results agreed with the recommended values. The dose conversion factors f and g, were independent of both depth in water and field size within the regions investigated.--Copyright 1973, Biological Abstracts, Inc.
W74-02198

SALT, A LITTLE-KNOWN AGGRESSOR IN OUR ENVIRONMENT, (IN FRENCH),
Neuchatel Univ. (Switzerland). Centre de Hydrogeologie.
B. Kubler.
Bull Soc Neuchatel Sci Nat. 95 p 133-163. 1972. Illus. (English summary).
Identifiers: Environmental effects, *Salts, *Switzerland.

The worldwide production and consumption of salt increases faster than the population. This translates into an encroachment on the environment. The salts resulting from industrial activity which attack the soil, the water and the atmosphere are, without doubt, the most serious, but they are easily detected. The daily or seasonal consumption by small non-industrial communities is alarming in its progress. This increase, which is almost logarithmic, is due to the rapid development of water-softener installations and to the salting of roads, which adds to the pollution already caused by automobiles. For example, in Switzerland, the consumption of deicing salt increased from 10,000 to 128,000 tons/yr between 1960 and 1970. If this progression were to continue, it would reach 1,200,000 tons by 1980. Therein lies the grave danger to the biotopes in rivers and lakes, the difficulties to be overcome by the water filtration plants and the problem of the drinking water supply.--Copyright 1973, Biological Abstracts, Inc.
W74-02199

AN ECOLOGICAL EVALUATION OF STREAM EUTROPHICATION,
Michigan State Univ., East Lansing. Inst. of Water Research.
For primary bibliographic entry see Field 05C.
W74-02201

THE USE OF POWER PLANT HEAT IN A PHYSICAL-CHEMICAL DOMESTIC WASTE-WATER RENOVATION SYSTEM,
Arizona Univ., Tucson. Dept. of Civil Engineering and Engineering Mechanics.
For primary bibliographic entry see Field 05D.
W74-02208

SOIL POLLUTION FROM CATTLE FEEDLOTS IN GEORGIA,
Georgia Univ., Athens. Dept. of Agronomy.
H. W. Fordham.
Available from NTIS as PB-226 083 $4.75 in paper copy, $1.45 in microfiche. M S Thesis, January 1973. 44 p, 9 fig, 10 tab, 34 ref. OWRR A-031-GA (2). 14-31-0001-3810.

Descriptors: *Feed lots, *Cattle, *Nitrates, Water pollution sources, *Farm wastes, *Georgia, Soil chemistry, Nutrients, Soil analysis.
Identifiers: *Goundwater pollution sources.

Soil samples were taken from 21 beef cattle feedlots in Georgia. Samples to 122 cm depth were taken upslope, within and approximately 30 and 90 m downslope from the lots. Soil samples were analyzed for extractable NO3, NO2, NH4, P, K, Ca, Mg, and for electrical conductivity, pH and organic matter. Soil nitrate was considerably less in the Georgia feedlots than in those in the more arid regions of the west and midwest. The average topsoil nitrate in feedlots was less than 20 ppm. Nutrients other than potassium did not show appreciable movement into the soil profile. It is concluded that pollution of ground water from beef cattle feedlots is probably not significant in Georgia. (Giddens-Georgia)
W74-02210

THE EFFECTS OF TRACE METALS ON GROUND WATER QUALITY AS INFLUENCED BY SOILS REFLECTING DIFFERENCES IN ORGANIC MATTER CONTENT AND GENETIC CONDITIONS,
Tuskegee Inst., Ala.
F. Ponder, Jr.
Available from the National Technical Information Service as PB-226 142, $5.50 in paper copy, $1.45 in microfiche. M.S., Thesis, May 1971. 61 p, 10 fig, 9 tab, 65 ref. OWRR B-028-Ala (4).

Descriptors: *Metals, *Zinc, *Absorption, *Organic soils, *Leaching, Soil chemistry, Water quality, Soil types, Acidic soils, Muck soils, Silts, Loam, Soil water movement, Percolation, Porosity, Drainage effects, Runoff, Ion transport, Chelation, Analysis, *Path of pollutants, Water pollution sources.

A review of literature on the correlation between organic matter and zinc content of soil and an investigation of zinc absorption using four different types of soil are presented. These soils were: Alaskan soil, a low humic glei soil with low pH and high in free iron oxides; muck, with a high pH and great amount of organic matter; Norfolk soil, loose, sandy, well-drained and well aerated; and Nebraska soil, which was a crofton silty clay loam. These soils, which were selected to represent a wide range of organic matter contents and genetic conditions, were prepared and submitted to studies of zinc adsorption and leaching. Soil and runoff water were analyzed for zinc content. The quantity of zinc absorbed by the soil increased as the organic content of the soil increased. Alaskan soil formed under very acid conditions absorbed less zinc than the muck soil. Potassium ions replaced large quantities of zinc from all the soils studied. It is concluded that organic matter is mainly responsible for the retention of zinc or other divalent metal by forming stable complexes. Groundwater having passed through soils high rather than low in organic matter will contain lesser quantities of divalent cations. (Jerome-Vanderbilt)
W74-02211

COMPUTER SIMULATION OF TROPHIC LEVEL INTERRELATIONSHIPS IN CAYUGA LAKE,
Cornell Univ., Ithaca, N.Y.
For primary bibliographic entry see Field 05C.
W74-02216

EXPERIMENTAL STUDIES ON PHYTOPLANKTON SUCCESSION IN CAYUGA LAKE,
Cornell Univ., Ithaca, N.Y.
For primary bibliographic entry see Field 05C.
W74-02217

THE QUANTITY AND DIMENSIONS OF MICROORGANISMS IN BOTTOM SEDIMENTS OF FISH-BREEDING PONDS (IN RUSSIAN),
Ukrainian Research Inst. of the Fish Industry, Kiev (USSR).
For primary bibliographic entry see Field 08I.
W74-02228

EFFECT OF A CINDER SETTLING TANK OF A THERMAL ELECTRIC POWER PLANT ON THE QUALITY OF SUBSURFACE WATERS, (IN RUSSIAN),
Municipal Sanitary-Epidemiological Center, Voroshilovgrad (USSR).
M. S. Burakhovich, A. S. Kolesnikov, and T. I. Ostrovskaya.
Gig Sanit. Vol 37, No 3, p 97-99. 1972.
Identifiers: *Cinder settling tanks, *Electric powerplants, Pollution, Subsurface water, *Thermal power, Water pollution sources, Settling basins.

The results of 15 yr observations showed that the cinder settling tank of a thermal electric power plant in the absence of waterproofing of its bed and in the presence of a hydrological link with subsurface waters serves as a source of their chemical pollution, expressed by an increase of salination of these waters.--Copyright 1973, Biological Abstracts, Inc.
W74-02231

USING THE ADSORPTION METHOD ON ACTIVATED CHARCOAL WITH CHLOROFORM EXTRACTION (CCE) FOR EVALUATING WATER POLLUTION BY ORGANIC SUBSTANCES, (IN RUSSIAN),
Permskii Politekhnicheskii Institut (USSR). Dept. of Sanitary Technology.
Ya. I. Visman, and S. Ya. Barikhin.
Gig Sanit. Vol 37, No 3, p 77-79. 1972.
Identifiers: Activated charcoal, Adsorption, *Charcoal-chloroform extraction, Evaluation, Methodology, *Organic wastes, *USSR, Water pollution sources, Reservoirs.

Experimental investigations were done from 1967-1970 for the purpose of using the charcoal-chloroform extraction (CCE) method for determining pollution in the Kama and Votkin reservoirs, USSR. The program included a quantitative measurement of water pollution by the CCE method, separation of the extracts into fractions, identification of the fractions, and isolation of individual components. An investigation of the extracts obtained permits not only differentiating individual water samples with respect to their degree of pollution by organic substances but also determining the qualitative composition of the pollutants.--Copyright 1973, Biological Abstracts, Inc.
W74-02232

EFFECT OF A CEMENT ANTICORROSION COATING ON THE QUALITY OF DRINKING WATER, (IN RUSSIAN),
Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad (USSR).
A. G. Ilichkina.
Gig Sanit. Vol 37, No 3, p 110. 1972.
Identifiers: *Cement, Coatings, *Corrosion control, Water quality standards, *Potable water.

A study of the effect of fine-grained Portland cement in the form of slabs submerged in water on the quality of water showed that the organoleptic and physicochemical properties of the water deteriorate. After preliminary decontamination of the slabs with active Cl and subsequent washing these changes were less pronounced but with long contact the water quality did not meet the standards for drinking water.--Copyright 1973, Biological Abstracts, Inc.
W74-02233

RELATION OF MINERAL AND HORMONE METABOLISM TO INTAKE OF WATER WITH A HIGH NATURAL CONTENT OF FLUORIDE,
L.L.R.M. Medical Coll., Meerut (India). Dept. of Pathology.
For primary bibliographic entry see Field 05C.
W74-02235

OCCURRENCE OF SAPROCHAETE SACCHAROPHYLA COKER ET SHANOR IN FUNGOID GROWTH BELOW THE DISCHARGE OF BREWERIES, (IN CZECH),
J. Hauslerova.
Ceska Mukol. Vol 26, No 4, p 233-237. 1972. Illus. (English summary).
Identifiers: *Breweries, Classification, Ecological studies, *Fungoid growth, Fusarium-Aqueductuum, Geotrichum-Candidum, Helicocephalum-Sp, Leptomitus-Lacteus, Mucro-Fragilis, Mucor-Globosus, Rhizopus-Nigricans, *Saprochaete-Saccharophyla, Seasonal, Industrial wastes, *Czechoslavakia (Bohemia).

Downstream of the waste water outflow from the brewery at Vysoky Chlumec (Bohemia, Czechoslovakia) a considerable growth of fungi filaments is ascertained throughout the year. The permanent investigation of this growth, from April 1970 to Feb. 1971, revealed that their composition is almost stable. The following species were observed: Fusarium aquaeductuum (Rad. et Rabenh.) Sacc., Leptomitus lacteus (Roth) Agardh, Geotrichum candidum Link ex Pers., Rhizopus nigricans Ehrenb., Mucor globsus Fisch., M. fragilis Bain., Helicocephalum sp., and Saprochaete saccharophyla Coker et Shanor, which during the period between Sept. 1970 and Jan. 1971 were found in large quantities. The systematical inclusion of S. saccharophyla still remains an open question. The occurrence of this organism is mentioned mostly in wastes and highly polluted waters, and so it can be considered as a member of the biocenose of polluted waters.--Copyright 1973, Biological Abstracts, Inc.
W74-02242

EFFECT OF HEATED WATER FROM KONAKOV HYDRO-ELECTRIC STATION ON OXYGEN CONTENT AND DEVELOPMENT OF PHYTOPLANKTON IN IVAN'KOVSKOE RESERVOIR DURING WINTER, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Institut Biologii Vnutrennykh Vod.
T. N. Kurdina, and V. G. Devyatkin.
Gidrobiol Zh. Vol 8, No 4, p 75-80. 1972. Illus.
Identifiers: Algae, Diatoms, *Heated water, *Hydro electric powerplant, Oxygen, Phytoplankton, Reservoirs, *USSR (Konakov), Winter, *Cyanophyta, *Chlorophyta, Termal pollution.

The discharge of heated water from the Konakov Hydroelectrical Station (USSR) created areas of increased temperature and oxygen content in the reservoir. The number of phytoplankton, including diatoms, green and blue-green algae, increased in heated and aerated waters. The number of species also increased, due mainly to increased numbers of diatoms. These indices can be used to determined the distribution of discharge water.--Copyright 1973, Biological Abstracts, Inc.
W74-02244

ON THE VARIATION OF SALINITY DISTRIBUTION IN A RESERVOIR, SITUATED IN RECLAIMED LAND, (JAPANESE),
Saga Univ. (Japan). Lab. of Shore Reclamation.
For primary bibliographic entry see Field 02H.
W74-02246

THE ABILITY OF BACTERIA TO MINERALIZE ALGAE ORGANIC MATTER, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Institut Biologii Vnutrennykh Vod.
V. M. Kudryavtsev.
Akademiya Nauk SSSR, Moscow. Institut Biologii Vnutrennykh Vod.
Identifiers: *Algae organic matter, Aphanizomenon, Bacillus, *Bacterial decomposition, Bacterium, Micrococcus, Microcystis, Mycobacterium, Pseudomonas, Sarcina, Scenedesmus-Quadricauda, *USSR (Kaibyshev reservoir), *Mineralization.

The bacterial decomposition of cells of Scenedesmus quadricauda and the biomass of phytoplankton found on the Kuibyshev water reserve, where algae of Aphanizomenon and Microcystis predominate was studied. Strains (15) of pure cultures were also used from Pseudomonas, Bacterium, Bacillus and Sarcina, Micrococcus and Mycobacterium families in order to determine the organic carbon content of algae. Bacterial oxidation of S. quadricauda varied 17-36%, while the organic content of phytoplankton varied by 50-67%. In a mixture of all bacteria, the results were 27.4% and 51.6% which was close to lake content of 25.3% and 51.5%.--Copyright 1973, Biological Abstracts, Inc.
W74-02252

MICROFLORA AND CHEMICAL COMPOSITION OF THE BOTTOM DEPOSITS OF THE KAIRAK-KUM RESERVOIR, (IN RUSSIAN),
Akademiya Nauk Tadzhikskoi SSSR, Dushanbe. Institut Zoologii i Parazitologii.
N. I. Bogdanov.
Izv Akad Nauk Tadzh SSSR Otd Biol Nauk. 2 p 42-46. 1972, Illus.
Identifiers: *Bottom deposits, *Chemical composition, Flora, Reservoirs, *USSR (Kairak-Kum reservoir), *Bacteria.

The organic content and total number of bacteria in the bottom deposits of the Kairak-Kum (USSR) reservoir was studied. Chemical and microbiological analysis showed that the paucity of benthos of this reservoir is related to the low organic content and microflora of the bottom deposits.--Copyright 1973, Biological Abstracts, Inc.
W74-02253

PROBLEMS WITH COLORED PAPERS: ARE THEY A CAUSE OF POLLUTION, (PROBLEME MIT FARBIGEN PAPIEREN: SIND SIE EINE URSACHE VON VERSCHMUTZUNG),
W. Schweisheimer.
Der Papiermacher, Vol 21, No 8, p 117-118, August 5, 1972.

Descriptors: *Water pollution sources, *Pulp wastes, Color, *Dye releases, Toxicity, Pulp and paper industry, Industrial wastes, *Biodegradation, Dyes.
Identifiers: Tissue papers, Facial tissues, Toilet tissues, *Colored paper.

The manufacture of colored paper products, such as toilet and facial tissues of various shades and hues, is discussed in relation to the biodegradability of the dyestuffs used and discharged with the paper machine effluent (white water). Studies of the chemical and toxicological properties of various dyes led to the belief that the dyeing of papers does not add materially to the water pollution problems of the paper industry. (Speckhard-IPC)
W74-02255

CHARACTERIZATION AND TREATMENT OF FISH PROCESSING PLANT EFFLUENTS IN CANADA,
Department of the Environment, Ottawa (Ontario).
For primary bibliographic entry see Field 05D.
W74-02262

EFFLUENT TREATMENT AT MAN-MADE FIBRE PRODUCTION UNITS,
Courtaulds Ltd., Coventry (England). Research Div.
For primary bibliographic entry see Field 05D.
W74-02263

MIGRATION OF SUBSTANCES WITH SURFACE AND GRAVITATIONAL WATERS IN SOILS OF GEOCHEMICALLY RELATED LANDSCAPES OF BARABA, (MIGRATSIYA VESHCHESTV S PVERKHNOSTNYMI I GRAVITATSIONNYMI VODAMI V POCHVAKH GEOKHIMICHESKI SOPRYAZHENNYKH LANDSHAFTOV BARABY),
Akademiya Nauk SSSR, Moscow. Pochvennyi Institut.
For primary bibliographic entry see Field 02G.
W74-02300

FIELD TESTS ON TRANSVERSE MIXING IN RIVERS,
Illinois Univ., Urbana. Dept. of Civil Engineering.
E. R. Holley.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10241, p 2313-2331, December 1973. 14 fig, 2 tab, 11 ref, append.

Descriptors: *Mixing, *Diffusion, *Dispersion, *Path of pollutants, Waste disposal, Rivers, Streamflow, Jetties, Groins (Structures).

Five tests were made on transverse mixing in rivers. The transverse turbulent diffusion coefficient, averaged over long flow distances, was as much as three times larger than the value for an equivalent straight rectangular flume. This increase is due to the additional mixing associated with the protective groins which were present and with the helical motion resulting from channel bends. Net transverse velocities exist in rivers and can cause the local rates of transverse spreading to be significantly different from the rate associated with the average diffusion coefficient. Recommendations are given for conditions to be met in order to obtain meaningful data from field tests on rates of transverse diffusion in rivers. (Knapp-USGS)
W74-02318

THE EFFECTS ON RUNOFF, GROUNDWATER, AND LAND OF IRRIGATING WITH CATTLE MANURE SLURRIES,
Tennessee Univ., Knoxville. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 05D.
W74-02326

CONTRIBUTION OF DEVELOPED AND NATURAL MARSHLAND SOILS TO SURFACE AND SUBSURFACE WATER QUALITY,
Wisconsin Univ., Madison. Dept. of Soil Science.
N. A. Isirimah, and D. R. Keeney.
Available from the National Technical Information Service as PB-226 071, $4.00 in paper copy, $1.45 in microfiche. Wisconsin Water Resources Center, Madison, Technical Report, September 1973. 30 p, 9 tab, 1 fig, 44 ref. OWRR A-049-WIS (1). 14-31-0001-3850.

Descriptors: *Organic soils, *Wetlands, *Marshlands, *Nitrogen, *Phosphorus, *Wisconsin, Water quality.
Identifiers: *Wingra watershed (Wis), Histosoils, Transformations.

Preliminary qualitative estimates of the role of natural and developed marshland soils as a nitrogen or phosphorus source or sink were obtained by a limited ground and surface water survey of a marsh adjacent to Lake Wingra, near Madison, Wisconsin and by laboratory investigations of nitrogen and phosphorus transformations in soil samples from this marsh and from an acid bog in northern Wisconsin. Results are presented on the rates and pathways of these transformations. The results indicate that the marsh does not act as a significant nutrient sink. Thus while removal of the marsh by draining or filling might result in more N and P entering the lake, its presence does not appear to be a factor in lowering lake productivity. Nutrient input into the lake probably could be lowered by discharging storm sewers on mineral soil rather than on the marsh.
W74-02327

WATER QUALITY CHARACTERISTICS OF STORM SEWER DISCHARGES AND COMBINED SEWER OVERFLOWS,
Illinois State Water Survey, Urbana.
V. Kothandaraman.
Circular 109, 1972. 19 p, 1 fig, 7 tab, 49 ref.

Descriptors: *Water pollution sources, *Outfall sewers, *Urban runoff, *Reviews, *Combined sewers, *Water quality, Separated sewers, Storm runoff, Storm water, Waste water treatment, Costs, Litter, Water pollution control, Pollutants, Heavy metals.

A study of the pollution from combined and separate storm sewers was made by reviewing pertinent case studies. A total of 49 references describing the quality characteristics of urban stormwater runoff were searched, with particular reference made to 25 of these studies. Suspended solids, volatile suspended solids, COD, BOD, total nitrogen, total phosphorus, and total coliform were compared for combined sewers, separate storm sewers, and raw sewage. Weibel, et al, (1966) found in studies in Cincinnati that separate storm runoff (annually) had the following loads as a percentage of raw sewage: suspended solids-160 percent, COD-33 percent, BOD-7 percent, total phosphate-5 percent and total nitrogen-14 percent. The American Public Works Association found that dirt and dust in street litter caused the most significant amount of pollution and varied from 0.4 to 5.2 pounds per day per 100 feet of curb. Proper street maintenance could minimize the pollutional effect of this material. Several mathematical models have been proposed to predict pollution of urban runoff. Two different models are described. Other studies have pointed out the effect of runoff pollution on streams and lakes. The estimated costs of solving pollution problems from urban runoff are given for various methods. Included are separation of sewers, chlorination, storage of water for later treatment, lagoon treatment, stream flow augmentation, and overflow treatment by grit chambers, settling tanks, and other methods. (Poertner)
W74-02345

GROUNDWATER EXPLORATION AND PROVISION FROM THE HYDROGEOLOGICAL POINT OF VIEW,
Bundesanstalt fuer Bodenforschung, Hanover (West Germany).
For primary bibliographic entry see Field 04B.
W74-02353

WATER QUALITY MANAGEMENT IN GROUNDWATER BASINS,
Arizona Univ., Tucson. Dept. of Hydrology and Water Resources.
A. K. Tyagi.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 46 p, 71 ref.

Descriptors: *Groundwater, *Water quality, *Saline water intrusion, Encroachment, Coasts, Southwest U.S., Mixing, Saline water, Salinity, Sea water, Water pollution effects, Waste water (Pollution), Pollutants, *Waste water disposal, Waste disposal wells, Saline water-freshwater interfaces.
Identifiers: *Mexico (Sonora).

Oceanic and connate waters, irrigation return flows, fertilizers, disposal of saline waters by deep injection wells, lagoons and playas, and disposal of mine wastes are the sources of groundwater contamination in coastal and inland aquifers. Hydrodynamics of the phenomena of saline water intrusion from various causes is discussed. The status of intrusion in forty of the states in the U.S. and in six other countries is reviewed with emphasis on Arizona, California, New Mexico, and Israel. A special example of sea water intrusion in the Hermosillo coastal aquifer in arid northwestern Mexico is presented. Significant research developments and progress underway for analyzing the formation and maintenance of the transition zone between fresh and salt waters are also presented with special attention to the need for proper recognition of physical situations producing contamination so the problems can be avoided rather than discovered too late. (Muller-Arizona)
W74-02356

SOME CHEMICAL AND BIOLOGICAL CHARACTERISTICS OF THE MISSISSIPPI RIVER BORDERING IOWA,
Iowa Univ., Iowa City.
D. B. McDonald.
In: Water-1972, AIChE Symposium Series No 129, Vol 69, 1973, p 380-372. 1 tab, 3 ref.

Descriptors: *Mississippi River, *Water quality, *Freshwater fish, *Aquatic habitats, *Water pollution effects, Alkalinity, Biochemical oxygen demand, Calcium, Carbonates, Bicarbonates, Chemical oxygen demand, Chlorides, Fluorides, Hardness (Water), Nitrogen, Magnesium, Manganese, Ammonia, Nitrates, Hydrogen ion concentration, Phosphates, Potassium, Dissolved solids, Suspended solids, Silica, Sulfates, Specific conductivity, Industrial wastes, Domestic wastes, Agricultural runoff, Nutrients, Sphaerotilus, Orthophosphates, Pesticides, Fertilizers, Dissolved oxygen, Water pollution sources.

The portion of the Mississippi River which borders Iowa contains a variety of habitats, such as main channel, off-channel, lake, and slough areas, which support a wide variety of fish of sport and commercial significance. Over 50 species were identified in pool 14 alone. Studies of the water chemistry indicate that the water quality is good compared to streams within the state although there are limited stretches of river where deteriorated water quality conditions occur. Pollutants may also be introduced into the river as a result of runoff from agricultural land. Oxygen concentrations are usually adequate for fish life; however, low dissolved oxygen levels have been observed in slough areas accompanying the death and decay of large algal masses. (Little-Battelle)
W74-02363

DISTRIBUTION OF CAESIUM-137 IN BRITISH COASTAL WATERS,
Ministry of Agriculture, Fisheries and Food, Lowestoft (England). Fisheries Radiobiological Lab.
D. F. Jefferies, A. Preston, and A. K. Steele.
Marine Pollution Bulletin, Vol 4, No 8, p 118-122, August 1973. 4 fig, 2 tab, 13 ref.

Descriptors: *Distribution patterns, *Radioactive wastes, Coasts, Water analysis, Sea water, Waste dilution, Separation techniques, Industrial wastes, Path of pollutants, Monitoring, Water pollution sources, Water pollution effects, Nuclear reactors, Nuclear wastes.
Identifiers: *Cesium-137, *Gamma spectrometry, Irish Sea, North Sea, North Channel, Sample preparation.

Water samples were collected from the Irish Sea, the northeast Atlantic, Scottish coastal waters, and the North Sea for analysis of Cs-137 emanating from the Windscale nuclear fuel reprocessing plant for the purpose of determining distribution patterns and dilution of this effluent. Cs-137 was determined by filtering seawater through a 0.22-millimicron membrane filter using one-step separation with either ammonium dodeca-molybdophosphate or potassium cobaltihexacyanoferrate followed by gamma spectrometry. More than 90 percent of the total cesium was retained in the filtrate. The data suggest that water leaving the Irish Sea through the North Channel moves round the coastline in a clockwise direction closely confined to the coastal margins of Scotland and then enters the northern North Sea, where its southern penetration may be detected as far south as the northern coast of England. This type of distribution has far-reaching implications for the fate of materials introduced to coastal waters since even Cs-137, which is relatively conservative in seawater, is largely confined in its distribution to inshore waters. Those materials which are less conservative and thus more rapidly removed from the water mass will be even more restricted in their distribution as a consequence. These general conclusions confirm the need to concentrate monitoring and surveillance operations in coastal waters, since the majority of pollutants are introduced regularly and in largest quantity at or near the shoreline. (Little-Battelle)
W74-02365

SEASONAL CHANGES IN THE ORGANIC FORMS OF CARBON, NITROGEN AND PHOSPHORUS IN SEA WATER AT EL IN THE ENGLISH CHANNEL DURING 1968,
Southampton Univ. (England). Dept. of Oceanography.
M. W. Banoub, and P. J. leB. Williams.
Journal of the Marine Biological Association of the United Kingdom, Vol 53, No 3, p 695-703, August 1973. 6 tab, 26 ref.

Descriptors: *Water analysis, *Seasonal, *Carbon, *Nitrogen, *Phosphorus, *Sea water, Separation techniques, Colorimetry, Ammonia, Chlorophyll, Organic matter, Storage.
Identifiers: *English Channel, Dissolved organic carbon, Sample preparation, Infrared spectrophotometry, Organic nitrogen, Ultraviolet spectrophotometry, Orthophosphates, Sample preservation, Particulate matter.

Water samples were collected at monthly intervals during 1968 at Station El in the English Channel for analysis of organic C, N, and P to determine seasonal variations. Two aliquots from each sample were filtered for particulate N and C analysis through two glass fiber filters, one for analysis of organic C and one for organic N. The filtrate was frozen in clean bottles until analysis. The filters were washed with K2SO4 and H2SO4 to remove inorganic carbonates and stored in solid CO2. Particulate organic C was measured by infrared analysis of CO2 formed by combustion. Particulate N was measured by Kjeldahl combustion followed by colorimetric determination of ammonia by conversion to indophenol blue. Dissolved organic C was analyzed by the method of Menzel and Vaccaro (1964), total N and P were determined by uv irradiation; and chlorophylls were determined according to the recommendations of the SCOR/UVESCO report (1966). The average integral mean values were: dissolved organic carbon, 780 micrograms C/l; dissolved organic nitrogen, 64 micrograms N/l; dissolved organic phosphorus, 3.8 micrograms P/l. Dissolved organic carbon and the particulate organic carbon and nitrogen showed increases subsequent to the spring bloom; such increases were less evident in the dissolved organic nitrogen results and not apparent in those of dissolved organic phosphorus. (Little-Battelle)
W74-02369

DISSIPATION AND PHYTOTOXICITY OF DICAMBA RESIDUES IN WATER,
Texas A and M Univ., College Station. Dept. of Range Science.
C. J. Scifres, T. J. Allen, C. L. Leinweber, and K. H. Pearson.
Journal of Environmental Quality, Vol 2, No 2, p 306-309, April/June 1973. 3 fig, 3 tab, 17 ref.

Descriptors: *Pesticide kinetics, *Pesticide toxicity, *Phytotoxicity, Water pollution effects, *Pesticide residues, Environmental effects, Chlorinated hydrocarbon pesticides, Water analysis, Pollutant identification, Water pollution sources, Laboratory tests, Resistance, Plant growth, Bioassay, Persistence, Volatility, Soil contamination, Path of pollutants, Herbicides, Water pollution, Microbial degradation, Water sampling.
Identifiers: *Dicamba, *Seedling crops, Dissipation, Fate of pollutants, Data interpretation, Banvel, Gas liquid chromatography, Cucumbers.

A study was conducted to evaluate (1) the influence of several environmental factors on dicamba dissipation from water, and (2) the biological significance of dicamba residues in water rela-

tive to growth and development of several crop species. Two south-central Texas ponds (only one was vegetated) were surface-sprayed with the dimethylamine salt of dicamba, and samples were taken and analyzed at 1, 3, 5, 7, 12, 15 and 20 days after treatment and thereafter at about 7-day intervals for an additional 70 days. Dicamba dissipation was studied under controlled greenhouse conditions using polyethylene containers under fluorescent lights. Dicamba concentrations in field samples were estimated using mustard seedling bioassay, spectrophotometric, and GLC techniques. Three greenhouse studies were conducted to evaluate seedling response of several crops to preemergence irrigation with water containing the herbicide. The herbicide dissipated most rapidly from water under non-sterile, lighted conditions. Pond sediment evidently contained microbial populations capable of decomposing the herbicide. Temperature was crucial in dicamba dissipation, especially in the presence of sediment. Influence of sediment on dissipation rate of dicamba was apparently augmented by light in some cases. Under summer conditions, dicamba at 4.4 kg/ha per surface area of ponds dissipated at about 1.3 ppm/day. Dicamba dissipated as a logarithmic function of concentration with time. Reaction of seedling crops to irrigation water containing dicamba varied among species and cultivars. Relative tolerance from these studies was ranked from most to least tolerant as follows: sorghum greater than cotton greater than cucumbers. (Holoman-Battelle)
W74-02370

CHLORODIOXINS IN PESTICIDES, SOILS, AND PLANTS,
Agricultural Research Service, Beltsville, Md. Agricultural Environmental Quality Inst.
C. S. Helling, A. R. Isensee, E. A. Woolson, P. D. J. Ensor, and G. E. Jones.
Journal of Environmental Quality, Vol 2, No 2, p 171-178, April/June 1973. 1 fig, 2 tab, 39 ref.

Descriptors: *Soil contamination, *Vegetation, *2 4 5-T, *Pesticide kinetics, *Toxicity, Water pollution sources, Persistence, Volatility, Absorption, Translocation, Pesticides, Plant tissues, Organic pesticides, Soils, Chemical analysis, Soil analysis, Wastes, Herbicides, Chlorinated hydrocarbon pesticides, Phenolic pesticides, 2 4-D, Herbicides, Fungicides, Acaricides, Insecticides.
Identifiers: *Chlorodioxins, Toxicology, *Pesticide formulations, Impurities, Chlorodibenzo-p-dioxins, Teratogenicity, Photodecomposition, Nitrofen, Volatilization, Chlorinated hydrocarbons, Dicamba, Trichlorophenol, Tetrachlorophenol, Pentachlorophenol, 2 4-DB, 2 4-DEP, Dichlorprop, Erbon, Sesone, Silvex, DMPA, Hexachlorophene, Ronnel.

Chlorodioxins, such as 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD), are highly toxic impurities found in certain pesticides. A review is made of (1) the sources and toxicology of TCDD and its relationship to the herbicide 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), and (2) pesticide analyses and soil-related environmental studies of TCDD conducted by the U. S. Department of Agriculture. TCDD was persistent and immobile in soils. The dioxin was not detected, however, 6 years after abnormally high applications of 2,4,5-T to Lakeland sand. TCDD was not photodegraded on soil and only slightly, in aqueous suspension. Plants grown in soil containing 0.06 ppm TCDD had no detectable quantity (less than or equal to 1 ppb) at maturity. It was not translocated when applied to leaves, but washoff or volatilization occurred. TCDD was undetected (less than 50 ppb) in 19 bald eagle (Haliaeetus leucocephalus) carcasses. (Holoman-Battelle)
W74-02371

COMPLEX BEHAVIOUR OF COBALT IN THE DANUBE RIVER,
Institut za Nuklearne Nauke Boris Kildric, Belgrade (Yugoslavia).
R. Radosavljevic, T. Tasovac, R. Draskovic, M. Zaric, and V. Markovic.
Archiv fur Hydrobiologie, Suppl. 44, No 2, p 241-248, March 1973. 2 fig, 6 tab, 14 ref.

Descriptors: *Cobalt, *Bottom sediments, *Plankton, *Suspended solids, *Path of pollutants, Hydrobiology, Aquatic animals, Water pollution, Chemical analysis, Trace elements, Heavy metals, Cobalt radioisotopes, Pollutants, Absorption, Water analysis, Algae, Caddisflies, Gastropods, Clams, Oligochaetes, Mollusks, Mussels, Snails, Ion exchange, Fish, Soil analysis.
Identifiers: *Danube River, Transport, Chemical concentration, Bioaccumulation, Animal tissues, Co-60, Sava River, Tisa River, Luganer See River, Unter See River, Zuger See River, Vierwaldstatter See River, Biological materials, Leeches, Alburnus alburnus, Ion exchange capacity.

As a part of a program for investigating the pollution of the Danube and studying the behaviour of different pollutants introduced in the river, systematic investigations of the content of Cobalt-60 and inactive isotope have been carried out and their concentrations in water, suspended material, bed sediments, plankton and other components determined. The capture of cobalt by suspended particles and bed sediments has been studied. The behaviour of cobalt in the Danube River is complex and depends on many parameters. The interdependences between the content of cobalt in water and dispersed components in the river, biomaterials, macro-and microchemical elements indicate that biogeochemical transport in the river is very heterogenous and depends on hydrodynamical conditions. The empirical curves of cumulative frequency distributions of particular levels of cobalt in the cross-section of the river at the kilometer 1144 and 1137 have log-normal distributions and confirm that hydrodynamical conditions in the river play an important role in transport of cobalt. Results of field and laboratory experiments are presented. (Holoman-Battelle)
W74-02373

ACCUMULATION OF FOSSIL CO2 IN THE ATMOSPHERE AND THE SEA,
Institute of Nuclear Sciences, Lower Hutt (New Zealand).
For primary bibliographic entry see Field 05C.
W74-02375

THE FORMATION OF WATER-IN-OIL EMULSIONS SUBSEQUENT TO AN OIL SPILL,
Nova Scotia Technical Coll., Halifax. Dept. of Chemical Engineering.
G. D. M. MacKay, A. Y. McLean, O. J. Betancourt, and B. D. Johnson.
Journal of the Institute of Petroleum, Vol 59, No 568, p 164-172, July 1973. 5 fig, 3 tab, 19 ref.

Descriptors: *Oil spills, *Chemical properties, Oil-water interfaces, Stability, Emulsifiers, Chemical analysis, Mass spectrometry, Isolation.
Identifiers: *Water-in-oil emulstions, *Emulsification, *Asphaltenes, *Crude oil, Stabilizing agent, Gas, Oil, Naphtha, Asphalt.

A series of experiments were carried out to obtain more information on the extremely stable water-in-oil emulsions formed when some hydrocarbon products are spilled at sea. It was established that the agent responsible for the stability was not a discrete chemical entity but was an asphaltenic type substance. The mechanism resulting in the stabilizing effect does not involve electrical double layer interaction, but is due to the mechanical strength of the asphaltenic layer encapsulating each water droplet. (Holoman-Battelle)
W74-02377

PHOTOLYSIS OF PARATHION (O,O-DIETHYL-O- (4-NITROPHENYL) THIOPHOSPHATE). NEW PRODUCTS,
Miami Univ., Oxford, Ohio. Hughes Labs.
J. R. Grunwell, and R. H. Erickson.
Journal of Agricultural and Food Chemistry, Vol 21, No 5, p 929-931, September/October 1973. 1 fig, 1 tab, 13 ref.

Descriptors: *Aqueous solutions, *Pollutant identification, Phosphothioate pesticides, Degradation (Decomposition), Irradiation, Organophosphorus pesticides, Pollutants, Environmental effects.
Identifiers: *Photolysis, *Parathion, *Degradation products, *Paraoxon, Photodecomposition, Triethylphosphate, O O O-triethylthiophosphate, O O S-triethylthiophosphate, Ethanol, Tetrahydrofuran, Mass spectra, Infrared spectra, Gas liquid chromatography.

Solutions of parathion and paracxon were irradiated at 2537 A for varying amounts of time and for 6 hr, respectively, in order to identify the photolytic products. Photoproducts were identified by gas liquid chromatographic retention time, mass spectra, and iafrared spectrum and by comparison with an authentic sample. O,O,S-Triethylthiophosphate was identified as the major product of the photolysis of parathion in aqueous THF or ethanol. Minor products were O,O,O-triethylthiophosphate, paraoxon, and triethylphosphate, which was formed by secondary photolysis of paraoxon. (Holoman-Battelle)
W74-02380

PERSISTENCE OF ENDOTHALL IN AQUATIC ENVIRONMENT AS DETERMINED BY GAS--LIQUID CHROMATOGRAPHY,
Syracuse Univ. Research Corp., N.Y. Life Sciences Div.
H. C. Sikka, and C. P. Rice.
Journal of Agricultural and Food Chemistry, Vol 21, No 5, p 842-846, September/October 1973. 3 fig, 1 tab, 9 ref.

Descriptors: Persistence, *Pesticide kinetics, *Aquatic environment, *Pesticide residues, *Radioactivity techniques, Herbicides, Water analysis, Hydrosols (Soils), Soil analysis, Aquaria, Pollutant identification, Gas chromatography, Aquatic soils, Chemical analysis, Farm ponds, Path of pollutants, Water sampling, Bottom sampling, Time, Methodology, Organic pesticides.
Identifiers: *Endothall, *Gas liquid chromatography, Fate of pollutants, Chemical recovery, Detection limits, Sample preparation, Thin layer chromatography.

A gas chromatographic method was used to determine the residues of endothall in both the water and hydrosoil of a farm pond and of laboratory aquaria. The bulk of endothall added to the aquaria remained in the water during the course of the experiment. Both in the pond and in the aquaria, the herbicide persisted in the hydrosoil for a longer period than in the water. In the pond treated with approximately 2 ppm of endothall, the herbicide could not be detected in the water and top 1 in. of the hydrosoil 36 and 44 days after treatment, respectively. In the aquaria treated with 2 and 4 ppm, endothall was reduced to nondetectable levels in the water within 7 days after treatment. It took 2 and 4 weeks for the herbicide in the hydrosoil to reach a level of less than 0.1 ppm in the aquaria treated with 2 and 4 ppm, respectively. The rate of endothall dissipation in the aquaria was similar at both application rates. (Holoman-Battelle)
W74-02381

RATES AND PRODUCTS OF DECOMPOSITION OF 2,2-DIBROMO-3-NITRILOPROPIONAMIDE,
Dow Chemical Co., Midland, Mich. Halogens Research Lab.
J. H. Exner, G. A. Burk, and D. Kyriacou.

Journal of Agricultural and Food Chemistry, Vol 21, No 5, p 838-842, September/October 1973. 3 fig, 4 tab, 19 ref.

Descriptors: *Microbial degradation, *Hydrolysis, *Pesticide kinetics, Environmental effects, Hydrogen ion concentration, Temperature, Chemical analysis, Pollutant identification, Soil contamination, Water pollution, Degradation (Decomposition), Bactericides, Chemical reactions, Carbon dioxide, Ammonia, Bromides, Polarographic analysis, Soil microorganisms, Halogenated pesticides, Organic pesticides, Water analysis, Aqueous solutions.
Identifiers: *Degradation rates, *Degradation products, Biocides, Nucleophiles, *Photodecomposition, 2 2-Dibromo-3-nitrilopropionamide, Fate of pollutants, Photolysis, Dibromoacetonitrile, Dibromoacetamide, Dibromoacetic acid, Glyoxylic acid, Oxalic acid, Sodium bisulfite, Cyanoacetamide, Sample preparation, Amides.

Rates and products of decomposition of 2,2-dibromo-3-nitrilopropionamide (DBNPA), an antimicrobial compound for industrial water treatment, were determined over a range of conditions. Rates of hydrolytic decomposition, determined polarographically at various pH's and temperatures, are consistent with acid- and base-catalyzed amide hydrolysis. Hydrolysis of DBNPA ultimately forms carbon dioxide, ammonia, and bromite ions via the following sequence of degradation products: dibromoacetonitrile, dibromoacetamide, dibromoacetic acid, glyoxylic acid, and oxalic acid. DBNPA reacts rapidly with various ions such as bisulfite to form cyanoacetamide. Decomposition under the influence of sunlight also leads to cyanoacetamide. Contact with soil and soil organisms degrades DBNPA. Decomposition of DBNPA by several chemical and biological pathways ensures that the compound will not persist in the environment. (Holoman-Battelle)
W74-02382

PICLORAM PHOTOLYTIC DECOMPOSITION,
Agricultural Research Service, Fort Collins, Colo.
A. R. Mosier, and W. D. Guenzi.
Journal of Agricultural and Food Chemistry, Vol 21, No 5, p 835-837, September/October 1973. 2 fig, 2 tab, 16 ref.

Descriptors: *Aqueous solutions, *Chemical analysis, *Radioactivity techniques, *Pollutant identification, Chlorinated hydrocarbon pesticides, Path of pollutants, Degradation (Decomposition), Herbicides, Gas chromatography, Irradiation, Separation techniques, Chemical reactions, Halogenated pesticides, Organic pesticides.
Identifiers: Fate of pollutants, *Picloram, *Photodecomposition, Quantitative analysis, Electron capture gas chromatography, Thin layer chromatography, Degradation products, Degradation pathway, Silver/silver chloride electrode, Scintillation counting, Decarboxylation.

Irradiation of a 0.00208 M aqueous solution of the picloram sodium salt with 300-380 nm ultraviolet light resulted in 99 percent degradation of the parent compound within 72 hr. After 5, 15, 25, 34, and 48 hr of irradiation, the amounts of picloram degradation were 15, 27, 31, 61, and 90 percent, respectively (all picloram solutions were analyzed as the methyl ester, solutions were methylated by diazomethane). After 34 hr of irradiation, 11 visually observable degradation products, excluding the spot of origin (spot no. 1) and parent compound (spot no. 13), were separated by tlc. Eight of these spots had radioactivity above background, which indicated that the carboxyl carbon (C-14) was still intact. No radioactivity was detected in the other three compounds, spots 5, 6, and 8, indicating decarboxylation. During photolysis, two chloride ions were produced per molecule of picloram photolyzed. Evidence was obtained to suggest that both a free radical and an ionic mechanism are involved in the photolysis of picloram. The overall reaction proceeds by a nonchain mechanism. (Holoman-Battelle)
W74-02383

CURRENT STATUS OF THE ENVIRONMENTAL AND HUMAN SAFETY ASPECTS OF NITRILOTRIACETIC ACID (NTA),
Little (Arthur D.), Inc., Cambridge, Mass.
P. S. Thayer, and C. J. Kensler.
CRC Critical Reviews in Environmental Control, Vol 3, No 4, p 375-404, September 1973. 2 fig, 15 tab, 74 ref.

Descriptors: *Nitrilotriacetic acid, Environmental effects, Pollutant identification, *Reviews, *Public health, *Biodegradation, *Toxicity, Water pollution effects, *Soil contamination effects, Surface waters, Water pollution sources, Metabolism, Animal physiology, Water pollution, Measurement, Path of pollutants, Sewage effluents, Sewage treatment, Rivers, Streams, Organic loading, Eutrophication, Plant growth.
Identifiers: Fate of pollutants, Sensitivity, NTA chelates, Degradation products, Substrate utilization, Degradation pathways, Mobilization, Enzymatic inhibitors, Teratogenicity, Mutagenicity, Carcinogenicity, Detergent builders, Iminodiacetic acid, Receiving waters, N-methyliminodiacetic acid, Sarcosine, Glycine, Sodium nitrilotriacetate, Sewage microorganisms, Shiwassee River, Hersey River, Raisin River, St. Joseph River, Detroit River, Black River, Total organic carbon, Meramec River, Acclimatization.

A review of the available experimental and field information on nitrilotriacetic acid (NTA) indicates a very low probability of environmental or human hazard at the maximally proposed levels of use in detergents. The probable average concentrations will be low, less than 25 parts per billion (ppb), in the domestic water supply and the high concentrations, 1,500 to 20,000 parts per million (ppm), required to produce adverse effects in animals appear to provide a more than adequate margin for safety. The probable effects on the environment, including contribution towards eutrophication of estuarine bodies of water, also appear to be minimal. The use of NTA in detergents should, however, be accompanied (1) by an environmental surveillance program to ensure that the probable low concentrations of NTA are the actual concentrations, and (2) a continuing research program to further assure environmental and human safety. (Holoman-Battelle)
W74-02394

THE DISTRIBUTION OF TRACE METALS AND FAUNA IN THE FIRTH OF CLYDE IN RELATION TO THE DISPOSAL OF SEWAGE SLUDGE,
Imperial Coll. of Science and Technology, London (England). Applied Geochemistry Group.
W. Halcrow, D. W. MacKay, and I. Thornton.
Journal of the Marine Biological Association of the United Kingdom, Vol 53, No 3, p 721-739, August 1973. 7 fig, 10 tab, 22 ref.

Descriptors: *Water analysis, *Heavy metals, *Sediments, *Sludge disposal, *Benthic fauna, *Marine fish, Calcium, Cadmium, Chromium, Copper, Iron, Manganese, Nickel, Lead, Zinc, Mercury, Carbon, Soil analysis, Water pollution effects, Absorption, Separation techniques, Sampling, Sewage disposal, Sewage sludge.
Identifiers: Atomic absorption spectrophotometry, Sample preparation, Silver, *Firth of Clyde, Sample preservation, Acid digestion, Preconcentration, Organic carbon, Background levels, Biological samples, Macroinvertebrates, Polychaetes, Liver, Muscle.

Sediment, water, and fauna were collected from the Firth of Clyde during September, 1971 to January, 1972 for analysis of heavy metals resulting from disposal of sewage sludge. Procedures for sample preparation are given. Ca, Cd, Cr, Cu, Fe, Mn, Ni, Pb, and Zn in sediments were determined by atomic absorption. Ag was determined by optical emission spectroscopy, and As, Mo, Sn, and V by colorimetry. Fauna were homogenized, and water was solvent extracted and preconcentrated for AA analysis. Only liver and muscle were analyzed from fish. Mercury in sediments was determined by cold-vapor AA after drying and acid digestion. Results show maximum ranges of Cu, Pb, and Zn to be confined to a relatively small area withing 2 km of the center of the dumping area. Hg showed a similar pattern with peak concentrations of 1820 ng/g at the center of the dumping site. Pb and Zn contents were also high at sites further up the Clyde; however, no evidence of large-scale transport was found. Organic carbon contents were 3-8 percent compared with background levels of 0.3-2.2 percent. Epifaunal species showed rather erratic variation in trace metal content, unrelated to total or readily extractable trace metals in the underlying sediment. The trace-metal content of demersal fish species was not significantly different from figures reported for elsewhere in the United Kingdom. The distributions of some in-faunal and epifaunal species in the area are described. It is concluded that the effects of sewage sludge disposal in this area are local, gross changes being limited to an area of about 20 sq km of sea-bed. However, little is known of the overall effects of toxic wastes particularly at threshold levels, and further monitoring is required. (Little-Battelle)
W74-02420

OCCURRENCE OF HEXACHLOROPHENE AND PENTACHLOROPHENOL IN SEWAGE AND WATER,
Oregon State Univ., Corvallis. Dept. of Agricultural Chemistry.
For primary bibliographic entry see Field 05A.
W74-02426

STABILITY AND REMOVAL OF COMMERCIAL DYES FROM PROCESS WASTEWATER,
Clemson Univ., S.C.
J. J. Porter.
Pollution Engineering, Vol 5, No 10, p 27-30, October 1973. 19 fig.

Descriptors: Stability, Environmental effects, *Aquatic environment, Waste water (Pollution), Natural streams, Reservoirs, Industrial wastes, Physical properties, Light, Waste water treatment, *Dyes, Color, Organic compounds, Degradation (Decomposition), Water pollution, Water temperature, Resistance, Gamma rays, Oxidation, Activated carbon, Hydrolysis, Reverse osmosis, Chemical precipitation.
Identifiers: Basic dyes, *Acid dyes, *Direct dyes, *Photodecomposition, *Textile industry, Pollutant removal, *Decolorization, Organic dyes, Degradation rates, Fate of pollutants, Degradation products, Chemical composition, Basic Violet 3, Basic Blue 9, Basic Green 1, Basic Green 4, Basic Red 2, Acid Red 1, Acid Violet 3, Acid Red 37, Acid Orange 10, Acid Black 52, Acid Blue 40, Direct Red 80, Direct Green 6, Direct Black 80, Direct Blue 76, Direct Red 83, Artifical light, Acid anthraquinone dyes, Acid azo dyes, Thiazine dyes.

A study has been made of the more common basic, acid, and direct dyes used by the textile industry in relation to their stability to light and water under conditions similar to those encountered when they are discharged to natural streams and reservoirs. All the basic dyes (triphenylmethane, phenazine and thiazine types) studied showed appreciable degradation during their 200-hr exposure to visible and ultraviolet light. Of the acid dyes studied, three showed drastic photoinduced degradation. The acid azo dyes were more fugitive to light than the acid anthraquinone dyes. The basic reason for degradation of acid dyes seems to be their suscep-

tibility to electrophilic attack. The data show that the direct dyes are more resistant to photodegradation than are the acid and basic dyes and that they would be stable and resist photochemical degradation in a treatment plant or receiving water. The data also show that the rate of degradation for direct dyes is at least 10 times as slow in natural daylight as in artifical light. Removal of dyes from waste water will depend on dye class and chemical composition. Color removal can be accomplished by activate carbon, a combined treatment of a chemical oxidant and gamma radiation, and lime precipitation. (Holoman-Battelle)
W74-02429

THE SPREADING OF HEAVY METALS IN FLOWING WATERS IN THE REGION OF OCCURRENCE OF NATURAL DEPOSITS AND OF THE ZINC AND LEAD INDUSTRY. (ROZPRZESTRZENIENIE METALI CIEZKICH W WODACH PLYNACYCH W REJONIE WYSTEPOWANIA NATURALNYCH ZLOZ ORAZ PRZEMYSLU CYNKU I OLOWIU),
Polish Academy of Sciences, Krakow. Zaklad Biologii Wod.
K. Pasternak.
Acta Hydrobiologica. Cracow, Vol 15, No 2, p 145-166, 1973. 2 fig, 3 tab, 43 ref.

Descriptors: Distribution, *Heavy metals, *Mine wastes, *Water pollution sources, Copper, Zinc, Lead, Cadmium, Manganese, Chromium, Cobalt, Molybdenum, *Water analysis, Mining, Waste disposal, Industrial wastes, Hydrogen ion concentration, Hardness (Water), Water temperature, Dissolved oxygen, Alkalinity, Iron, Sulfates, Organic matter, *Mine water, Water pollution effects, Water quality, Path of pollutants, Magnesium.
Identifiers: Strontium, Barium, Poland, Background levels, River Biala Przemsza, Preconcentration, Atomic absorption spectrophotometry, Sample preparation.

Waters from channels, streams, and rivers in the area of lead and zinc mining (Boleslaw) were analyzed for Cu, Zn, Pb, Cd, Mn, Cr, Co, Mo, Sr, and Ba to investigate the contribution of these industries to metal concentrations in the water. Samples were collected in polyethylene bags and prepared for determination of microelements (except Sr) by evaporating and dissolving the residue in nitric acid. Determinations were made by atomic absorption spectroscopy. It was found that these industries contribute significant amounts of Zn, Pb, and Cd to the receiving waters, and these metals may be transported considerable distances. Lead content decreases the fastest and zinc content the slowest as the distance from the pollution source increases. The natural occurrence of lead and zinc ores in the deeper rock layers does not to any extent influence the surface waters with pH about 8.1 and with high total hardness. The increase in the content of zinc, lead, and cadmium in the water of the investigated water courses is mainly connected with the industrial pollution. The quantitative level of these three heavy metals shows a distinct tendency to increase in the autumn-winter season. The occurrence of calciumdolomite rocks in the catchment basin of the investigated water courses is revealed in the chemism of the water by an exceptionally high content of magnesium and a low content of manganese and copper. (Little-Battelle)
W74-02435

A COMPARISON OF THE CONTENT OF MICROELEMENTS IN THE WATER OF THE RIVER DANUBE NEAR VIENNA AND BELGRADE FOR 1961-1970 (EIN VERGLEICH DES GEHALTES AN SPURENELEMENTEN IM DONAUWASSER BEI WIEN UND BEOGRAD FUE 1961-1970),
Bundesanstalt fuer Wasserbiologie und Abwasserforschung, Vienna (Austria).
For primary bibliographic entry see Field 05A.
W74-02436

A MASS BALANCE MODEL OF TRACE METALS IN SEVERAL DELAWARE WATERSHEDS,
Delaware Univ., Newark. Coll. of Marine Studies.
R. B. Biggs, J. C. Miller, M. J. Otley, and C. I. Shields.
Available from the National Information Service as PB-226 243 $3.00 in paper copy, $1.45 in microfiche. Technical Research Project Completion Report, November 1973, 47 p, 2 fig, 7 tab, 12 ref. OWRR A-018-DEL (2).

Descriptors: *Trace Elements, *Water chemistry, *Cadmium, *Lead, *Copper, *Mercury, *Rainfall, Chemisal precipitation, Fallout, Water pollution control, Water pollution sources, Water pollution, Atlantic coastal plain, *Delaware, Pollutant identification, Water quality standards.

Concentrations of copper, cadmium, lead, and mercury were measured in seven Delaware streams and in rainfall at four locations. Annual inputs of metal to watersheds from rainfall and outputs of metal dissolved in streams were calculated. High (exceeding U.S.P.H.S. drinking water standards) concentrations of cadmium and lead were evident in rainfall especially during the winter. Metal concentrations in streams never reached such high concentrations. In southern Delaware 90% of the cadmium and 70% of the copper that enters the watershed dissolved in rain is retained by the watershed or passes out associated with suspended particulate matter. In northern Delaware, 80% of the cadmium and all of the copper (on a mass balance) that enters watersheds dissolved in rain exits the watershed dissolved in the streams.
W74-02443

THE INFLUENCE OF ORGANIC DECOMPOSITION ON CARBON DIOXIDE HYDROGEN SULFIDE, DISSOLVED OXYGEN, AND ALGAE GROWTH IN THE DWORSHAK RESERVOIR,
Idaho Univ., Moscow. Dept. of Bacteriology and Biochemistry.
For primary bibliographic entry see Field 05C.
W74-02444

HEAVY METALS IN THE MAIN STREAMS OF THE JAMES RIVER BASIN, MISSOURI,
Missouri Water Resources Research Center, Rolla.
For primary bibliographic entry see Field 05A.
W74-02445

DESCRIPTION, DISTRIBUTION, AND ECOLOGY OF THE ROTIFER AND CRUSTACEAN PLANKTON COMMUNITIES, FLATHEAD LAKE, MONTANA,
Montana Univ., Missoula. Dept. of Zoology.
For primary bibliographic entry see Field 02H.
W74-02448

DISPERSION OF SUBSTANCES FROM WELL RECHARGE OPERATIONS IN AN ANISOTROPIC, HOMOGENEOUS CONFINED AQUIFER,
Wisconsin Univ., Madison. Dept. of Civil and Environmental Engineering.
For primary bibliographic entry see Field 02F.
W74-02454

UPTAKE OF MERCURY BY FISH IN NATURAL AND ARTIFICIAL SYSTEMS,
New Mexico Inst. of Mining and Technology, Socorro. Dept. of Biochemistry.
D. H. Baker, III, C. J. Popp, and D. K. Brandvold.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, p 40-49, July 1973. 4 fig, 7 tab, 7 ref.

Descriptors: *Water pollution sources, *Mercury, *New Mexico, Surface waters, Industrial wastes, Data collections, Water analysis, Fish, Correlation analysis, Laboratory tests, Analytical techniques.

Since New Mexico has a limited water supply, a mercury contamination problem could possibly exist on a local or state level. A small amount of mercury contamination could remove a large percentage of water from use. New Mexico at this time has a relatively mercury-free environment. The few manmade sources of mercury such as smelters and coal-burning powerplants may be too scattered and twoo small to cause any major mercury problems. Other industrial sources do not exist, and agricultural practices have not caused any documented contaminations in New Mexico's waters. Studies of mercury in natural waters throughout the State are in progress at the State Bureau of Mines. The preliminary results show that the levels of mercury are relatively low. Concentration of mercury by fish from natural waters was studied at the Bosque del Apache National Wildlife Refuge south of Socorro, New Mexico. These results are compared with data obtained from laboratory experiments of uptake by goldfish from low-level mercury concentration. (See also W74-02456) (Woodard-USGS)
W74-02460

EVALUATION OF NITRATE CONTENT OF GROUND WATER IN HALL COUNTY, NEBRASKA,
Illinois State Environmental Protection Agency, Springfield. Div. of Land Pollution Control.
R. Piskin.
Ground Water, Vol 11, No 6, p 4-13, November-December 1973. 4 fig, 8 tab, 9 ref.

Descriptors: *Nitrates, *Water pollution sources, *Groundwater, *Nebraska, Farm wastes, Fertilizers, Septic tanks, Sewage, Water table, Groundwater movement.
Identifiers: Hall County (Nebr).

Nitrate concentrations in groundwater are low (less than 10 mg per liter) in most parts of Hall County, Nebraska. Water from 46% of the sampled wells had nitrate concentrations greater than 10 mg per liter, and 13% had greater than 45 mg per liter. Sharp contrasts in concentrations occur within short distances. Seasonal changes and a progressive increase of nitrate concentrations occur in some observed wells. Concentrations decrease with increasing well depth and well penetration below the water table. Nitrate in groundwater is stratified where the concentration is high. Highest concentrations are found at or near the water table in the vicinity of sampled wells located close to a nitrate source. Potential sources of nitrate in the groundwater of Hall County are fertilizers, feedlots, septic tank effluents, seepage from the Wood River, precipitation, and soil fertility. Whereas seepage from the Wood River contributes nitrate to groundwater adjacent to the stream, seepage from the Platte River dilutes the nitrate content of groundwater. The hydraulic condutivity of the unsaturated zone is an important factor in controlling nitrate content of groundwater. (Knapp-USGS)
W74-02465

FATE OF PETROLEUM HYDROCARBONS IN BEACH SAND,
Naval Biomedical Research Lab., Oakland, Calif.
H. E. Guard, and A. B. Cobet.
Available from NTIS, Springfield, Va. 22151 as AD-758 740, Price $3.00 printed copy; $1.45 microfiche. Final Contract report, 1972. 89 p, 39 fig, 29 tab, 20 ref. USCG Contract CG-13, 337. ONR N00014-69-A-0200-1001.

Descriptors: *Oil pollution, *Beaches, *Sands, *California, *Organic compounds, Oil spills, Biodegradation, Chemical reactions, Data collections, Soil microbiology, Bacteria, Pollutant identification, Environmental effects, Ecology, Evaporation, Lysimeters.
Identifiers: *San Francisco area (Calif).

Studies at four sampling locations on three beaches in the San Francisco area affected by oil from an 840,000 gal spill of Chevron bunker fuel have shown that the size of the bacterial population and distribution of bacterial genera within the beach were unaffected by the petroleum hydrocarbons remaining in the beach sand after completion of the cleanup operation. Only 15% of the beach bacteria were affected by a variety of petroleum components including the pentane soluble fraction of the bunker fuel. Abnormally high concentrations of chloroform extractable material with considerable variation were observed at two sampling locations following the spill. Log-normal distribution analysis of the concentration of the chloroform extractable material indicates that the sampling locations on the San Francisco Bay have higher background levels (5% limit concentrations) of chloroform extractable material than the beaches on the ocean. Laboratory experiments indicated that the lower molecular weight components of bunker fuel dispersed in a beach will be removed by evaporation, dissolution and biodegradation acting in concert. (Woodard-USGS)
W74-02473

SELECTED REFERENCES, GROUND-WATER CONTAMINATION, THE UNITED STATES OF AMERICA AND PUERTO RICO.
Geological Survey, Washington, D.C. Water Resources Div.

Open-file report, 1973. 103 p.

Descriptors: *Bibliographies, *Water pollution sources, *Groundwater, *United States, *Puerto Rico, Information retrieval, Publications, Water quality, Groundwater resources, Pollutant identification, Path of pollutants, Water pollution effects, Water pollution control, Environmental effects, Surface-groundwater relationships.

In 1972 the U.S. Geological Survey, Water Resources Division, made a reconnaissance study of the location and severity of groundwater contamination throughout the 50 States and Puerto Rico. During the course of that study a substantial list of references pertaining to groundwater contamination was obtained. The references are listed alphabetically and are also indexed according to geographic areas, States, kinds of contamination, sources of contamination, and general discussions. (Woodard-USGS)
W74-02482

ON THE CHARACTERISTICS OF SALT INTRUSION IN THE KITAKAMI RIVER, MIYAGI PREFECTURE (IN JAPANESE),
Japanese Society of Limnology, Otsu (Japan).
Y. Tontani.
Jap J Limnol, Vol 33, No 1, p 1-5, 1972. Illus. English summary.
Identifiers: *Japan (Kitakami River), Rivers, *Salt water intrusion, *Salinity, Water temperature, Velocity.

During the period 1965-1968, determinations were made of salinity, temperature and velocity in the Kitakami River (Japan). The salinity concentration of the bottom layer is much higher than the surface layer at the lower end of the river. Consequently, the water of the surface layer is fresh water and that of the bottom layer is salt water. The salt wedge type of the Kitakami River shows fine negligible mixing. This phenomenon is rare, because in the rivers emptying into the Pacific Ocean, it is generally moderate mixing. The salt wedge type is caused by the level difference between the low water and the higher water, but it is also caused by discharge. The salt wedge length was affected by an influence of discharge. When discharge decreases to about 70 m3/sec, the salt water intrudes into upper stream, about 8 km from river mouth. But, when discharge increases to about 400 m3/sec, the salt water is restricted to the vicinity of the river mouth.--Copyright 1973, Biological Abstracts, Inc.
W74-02541

CLEANLINESS OF WELLS, CHEMICAL SUBSTANCES IN DRINKING WATER AND THEIR RELATION TO CARIES (IN POLISH),
For primary bibliographic entry see Field 05C.
W74-02544

HYGIENIC CONDITIONS IN THE PROCUREMENT OF DRINKING WATER FROM INDIVIDUAL SOURCES (IN GERMAN),
J. Preuner Von Prittwitz.
Zentralbl Bakteriol Parasitenkd Infektionskr Hyg Erste Abt Orig Reihe B Hyg Praev Med, Vol 155, No 5, p 374-383, 1972, English summary.
Identifiers: *Bacteria, *Hygienic conditions, *Potable water, Water wells, Water sources.

Wells, when used as a source of drinking water, constitute a direct danger from the hygienic and bacteriological aspects for the persons who are supplied with this drinking water. An urgent demand is made for the revision of the regulations concerning the sinking of wells, in order that the digging of wells shall be prohibited in general, even if it is carried out by firms specializing in this work. In addition, the public authorities (Health Department, Police, Hygiene Institute, Parish and Rural District Councils) should endeavor to replace existing wells with supplies of pure drinking water, if such water can be obtained or delivered, even if this is accompanied by higher costs.--Copyright 1973, Biological Abstracts, Inc.
W74-02547

INFLUENCE OF HERBICIDES ON MICROBIOLOGICAL CONDITIONS,
Komenskeho Universita, Bratislava (Czechoslovakia). Dept. of Microbiology.
A. Dubovska.
Acta Fac Rerum Nat Univ Comenianae Microbiol. 1. p 53-65, 1971, Illus.
Identifiers: *Atrazine, *Azotobacter, Fungi, *Herbicides, Microbiological conditions, Organic matter, *Simazine, Soil moisture, Microorganisms.

Seasonal changes of the groups of microorganisms depended predominantly on soil moisture and the amount of organic material in the soil. Simazine and atrazine, added to the soil at the rate of 80-1000 ppm, stimulated N fixation by Azotobacter in laboratory experiments, but not in field trials. Simazine and atrazine exerted the strongest inhibition on the quantity and dynamics of fungi. The influence of these herbicides, both on ammonia-forming microorganisms and on pectinolytic and aerobic cellulolytic microorganisms differed according to ecological factors. Azotobacter was slightly susceptible to the herbicides in the doses used.--Copyright 1973, Biological Abstracts, Inc.
W74-02548

THE EFFECT OF TEMPERATURE ON THE GENERATION TIME OF A BACTERIAL COMMUNITY IN LAKE WATER,
Polish Academy of Sciences, Warsaw. Inst. of Ecology.
W. A. Godlewska-Lipowa.
Bull Acad Pol. Sci Ser Sci Biol. Vol 20, No 9, p 653-656. 1972. Illus.
Identifiers: *Bacterial community, *Generation, Lakes, *Water temperature.

The effect of temperature on the reproduction intensity of a bacteria population in natural lake water was examined as was the generation time. The most intensive increase in number took place at 25, and the least intensive at 6 and 30C. The generation time of the bacteria community according to Razumov was shortest at 25 and longest at 6 and 30.--Copyright 1973, Biological Abstracts, Inc.
W74-02557

THE USE OF ERTS-1 MSS DATA FOR MAPPING STRIP MINES AND ACID MINE DRAINAGE IN PENNSYLVANIA,
Pennsylvania State Univ., University Park. Office for Remote Sensing of Earth Resources.
For primary bibliographic entry see Field 07B.
W74-02573

MONITORING OCEAN DUMPING WITH ERTS--1 DATA,
Environmental Research Inst. of Michigan, Ann Arbor.
For primary bibliographic entry see Field 07B.
W74-02580

A REPORT ON BACTERIAL POLLUTION AFFECTING SHELLFISH HARVESTING IN NEWPORT RIVER, NORTH CAROLINA.
Environmental Protection Agency, Athens, Ga. Surveillance and Analysis Div.

Available from NTIS, Springfield, Va. 22151 as PB-215 291. Price $3.00 printed copy; $1.45 microfiche. Region IV Report, April 1972. 43 p, 9 fig, 10 tab, 11 ref, 2 append.

Descriptors: *Water pollution sources, *Bacteria, *Estuaries, *North Carolina, Environmental effects, Shellfish, Coliforms, Sewage effluents, Septic tanks, Animal wastes (Wildlife), Fertilizers, Sampling, Tributaries, Tidal effects, Salinity, Data collections, Evaluation, Path of pollutants, Water pollution effects.
Identifiers: *Newport River (NC).

Portions of the Newport River in North Carolina have been closed to shellfish harvesting since 1969 due to excessive levels of coliform bacteria in the growing waters. Closure of the area to shellfish harvesting coincided with a by-pass of untreated domestic wastes from the town of Newport. During the December 1971 study period, excessive coliform levels in the shellfish growing areas of the Newport River were not attributable to waste discharges from the Newport sewage treatment plant or the West Cateret High School waste treatment facility. The majority of the coliform population contributed to the upper Newport River estuary is introduced from tributary streams and sources incidental to the river shore. Of the tributaries sampled above 'The Narrows,' Deep Creek and Hull Swamp contribute the largest number of coliforms. Wildlife common to these areas, together with agricultural runoff, serve as major sources of coliform contamination within the watershed. The concentration of septic tanks in the unincorporated areas of the watershed, especially those installed in areas unsuited for adequate operation, have the potential for contributing bacterial pollution to the Newport River and tributary streams. (Woodard-USGS)
W74-02621

BASIC WATER-QUALITY DATA FOR POLLUTION ABATEMENT PLAN, TAMPA BAY AREA, FLORIDA,
Geological Survey, Tallahassee, Fla.
R. C. Reichenbaugh, J. S. Rosenshein, and K. L. Westly.
Open-file report 73020, 1973. 137 p, 1 fig, 8 tab.

Descriptors: *Water quality, *Water pollution sources, *Chemical analysis, *Data collections, *Florida, Storm runoff, Surface waters, Water

pollution control, Pollution abatement, Municipal wastes, Industrial wastes, Sewage effluents, Water analysis, Nutrients, Trace elements.
Identifiers: *Tampa Bay area (Fla).

The Tampa Bay Regional Planning Council is formulating a waste-water treatment plan for the greater Tampa Bay area in cooperation with the Environmental Protection Agency. The area covered by this plan includes Hillsborough, Manatee, Pasco, Pinellas, and Sarasota Counties, Florida. In October 1972, the Planning Council entered into a cooperative agreement with the U.S. Geological Survey to collect and analyze water samples from streams, industrial plants, sewage treatment plants, and their receiving waters. The analyses are to be used in the Planning Council's modeling effort and as benchmark information on water-quality conditions in the greater Tampa Bay area. This report makes available the water-quality data collected as a part of this study and also the data obtained in the cooperative programs between the Geological Survey and other agencies, such as the Southwest Florida Water Management District. Data on water quality at nine stream sites with records as much as 19 years are also included. (Woodard-USGS)
W74-02629

SEASONAL AND AREAL DISTRIBUTION AND ABUNDANCE OF THE COPEPODA IN A MISSISSIPPI ESTUARINE SYSTEM,
Mississippi Marine Conservation Commission, Biloxi.
For primary bibliographic entry see Field 02L.
W74-02637

STUDIES OF THE SINKING PLUME PHENOMENON,
Argonne National Lab., Ill. Center for Environmental Studies.
For primary bibliographic entry see Field 05C.
W74-02644

SEDIMENTATION AND SCOUR OFF NUCLEAR POWER PLANTS,
Wisconsin Univ., Madison. Marine Research Lab.
For primary bibliographic entry see Field 02J.
W74-02645

5C. Effects of Pollution

THE EFFECTS OF ACID MINE WATER ON GROWTH (NUMBER AND SIZE) OF CHLORELIA VULGARIS,
West Virginia Univ., Morgantown. Dept. of Biology.
W. A. Janeczek, E. C. Keller, III, W. J. Shoupp, and E. C. Keller, Jr.
Proceedings of the West Virginia Academy of Science, Vol 44, No 1, p 40-49, April, 1972. 6 fig, 1 tab, 8 ref.

Descriptors: *Algae, *Acid mine water, *Chlorella, Water pollution, Water pollution effects, Water quality, *Chlorphyta, *Growth rates, Size, Growth stages, Cultures, Ecosystems.

Growth in Chlorella vulgaris was examined under axenic conditions in a variety of acid mine water (AMW) concentrations, and inorganic nutrient media, to ascertain the relationship between cell number and cell size. High concentration of AMW (above 3/16) decreased the average cell size. At concentrations of 3/16 AMW or more, cell number was greatly decreased. The normal relationship that exists between cell size and cell number during growth was greatly modified by AMW concentrations greater than 3/16. (See also W74-02169)
W74-02168

THE GROWTH OF CHLORELLA VULGARIS IN SEWAGE AND ACID MINE WATER,
West Virginia Univ., Morgantown. Dept. of Biology.
W. F. Skinner, and E. C. Keller, Jr.
Proceedings of the West Virginia Academy of Science, Vol 44, No 1, p 49-56, April, 1972. 4 fig, 6 ref.

Descriptors: *Algae, *Acid mine water, *Chlorella, Water pollution, Water pollution effects, Water quality, *Chlorphyta, *Growth rates, Growth stages, Cultures, Ecosystems, *Sewage.

Preliminary research has been conducted to determine the effects of sewage, acid mine water (AMW), and their interaction on the growth of the unicellular green alga Chlorella vulgaris Beijerink (Pratt strain). The nutrient media were composed of sterile synthetic sewage and/or acid mine water diluted to the desired concentrations with a standard inorganic culture medium (modified Beijerinck's medium). Six concentrations of sewage (0/0, 1/32, 1/16, 1/8, 1/4, 1/2), four concentrations of AMW (0/0, 1/31, 1/16, 1/8), alone and in all possible combinations were evaluated. The cultures were grown at 25C in 24x150 mm glass culture tubes, aerated, and agitated with sterile humidified air, and illuminated from below by approximately 500 f.c. light intensity by 'Gro-lux' fluorescent tubes. The maximum growth was obtained with the 1/2 sewage treatment, the least amount of growth occurred in the 1/8 AMW + 1/2 sewage treatment. Chlorella vulgaris was apparently able to utilize some of the components in the sewage since better growth occurred in all treatments containing only sewage than in the controls. However, high concentrations of sewage in combination with high concentrations of AMW inhibited algal growth. (See also W74-02168)
W74-02169

AN INVESTIGATION OF THE PHYSICAL EFFECTS OF THERMAL DISCHARGES INTO CAYUGA LAKE,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 05B.
W74-02178

PERSISTENT SEA-FOAM MASSES -- A PROBLEM SOLVED,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 05B.
W74-02180

ON THE RELATION BETWEEN THE OCCURRENCE OF DESMIDS AND THE SALINITY IN THE HOKURIKU DISTRICT OF JAPAN, (IN JAPANESE),
Nijo Junior High School, Kyoto (Japan).
For primary bibliographic entry see Field 05B.
W74-02191

SOME REGULARITIES OF SR90 ACCUMULATION IN THE BODY OF A RAT WITH A HIGH FLUORINE CONTENT IN ITS DRINKING WATER, (IN RUSSIAN),
E. V. Danetskaya, V. A. Knizhnikov, P. V. Ramzaev, and M. N. Troitskaya.
Gig Sanit. Vol 37, No 8, p 49-53. 1973. (English summary).
Identifiers: *Fluorine content, Rats, *Strontium-90, *Potable water.

Preliminary introduction (for 1.5 mo.) of F in water produced a decrease in the Sr90 concentration in the ashes of rat bones and corpses. The total content of the isotope in the body was unaltered.--Copyright 1973, Biological Abstracts, Inc.
W74-02195

SOME CHARACTERISTICS OF CESIUM-137 ACCUMULATION IN POPULATIONS OF FRESHWATER FISH, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Inst. of Evolutionary Morphology and Animal Ecology.
A. I. Il'enko.
Vopr Ikhtiol. Vol 12, No 1, p 174-178. 1972. Illus.
Identifiers: *Cesium-137, Fish (Fresh water), Muscle, *Pike, Fish populations, *Roach, Water pollution effects.

The experiments were performed in a water reservoir with an artificially changing Cs-137 source. The seasonal changes in concentration of the isotope in the muscle of roach and pike, in food, and water were determined. The concentration of the isotope in the food and of roach muscle in the roach reflected its concentration in the water. However the same was not true for the pike: the concentration in the muscles did not correspond to the concentration in the water.--Copyright 1973, Biological Abstracts, Inc.
W74-02196

ACCUMULATION OF STRONTIUM AND CALCIUM IN FRESHWATER FISHES OF JAPAN,
National Inst. of Radiological Sciences, Chiba (Japan). Dept. of Environmental Contamination.
Y. Suzuki, R. Nakamura, and T. Ueda.
J Radiat Res. Vol 13, No 4, p 199-207. 1972. Illus.
Identifiers: Bone, *Calcium, *Carp, Fallout, Fish (Freshwater), *Gibel, Japan, *Strontium-90, Water pollution effects.

The 90Sr contents in bones of freshwater fishes (carp and gibel) from radioactive fallouts were investigated in relation to those in the surrounding waters from 1963-1970. The specific activities (90Sr/Sr) of fish bones and of the surrounding waters declined rapidly from 1963-1964, followed by a gradual decline from 1964-1970. The specific activities of fish bones were always slightly higher than those of the waters, except that of gibel in 1963. The time lag between Sr specific activities of fish bones and those of surrounding waters were 270 days for carp and 360 days for gibel. The discrimination between stable Sr and Ca in freshwater fishes was demonstrated: in the field studies, the Sr-Ca observed ratio (OR) were determined as 0.74 plus or minus -.05 for carp and 0.84 plus or minus 0.07 for gibel respectively. In rearing experiments, the Sr accumulation of carp reared in the water of 2 x 10-1 mg Ca/l. It is possible to estimate 90Sr content in the bones of carp and gibel by using their OR values and the time lag of Sr specific activity between the freshwater fish bone and the surrounding water.--Copyright 1973, Biological Abstracts, Inc.
W74-02197

SALT, A LITTLE-KNOWN AGGRESSOR IN OUR ENVIRONMENT, (IN FRENCH),
Neuchatel Univ. (Switzerland). Centre de Hydrogeologie.
For primary bibliographic entry see Field 05B.
W74-02199

AN ECOLOGICAL EVALUATION OF STREAM EUTROPHICATION,
Michigan State Univ., East Lansing. Inst. of Water Research.
R. C. Ball, and N. R. Kevern.
Available from NTIS as PB-226 140 $6.50 in paper copy, $1.45 in microfiche. OWRR-3381 (No 3723) (5), C-2205 (No 3386) (5), and C-1663 (No 3153 (7). Project Completion Report, July 1973. 253 p, 69 fig.

Descriptors: Brown trout, Sculpin, Toxicity, *Eutrophication, Water quality, Discharge (Water), *Macrophytes, *Phosphorus, Nitrogen, *Periphyton, *Invertebrates, *Benthos, Artificial substrates, Fish populations, Drift, Metabolism, Chlorinated hydrocarbons, Pesticides, Social aspects, Recreation, *Michigan.

Identifiers: Jordan River (Mich), Au Sable River (Mich), Red Cedar River (Mich), National Fish Hatchery.

Three streams, varying in degree of disturbance by man, were selected for study; ranging from pristine to heavily disturbed. The aims of the study were to develop indices for predicting changes in streams as they are subjected to increasing eutrophication, to obtain baseline data that relates stream characteristics to water quality, to evaluate the effects of urbanization on stream stability and to measure the aesthetic and recreational values of streams. Diurnal patterns in dissolved oxygen concentration were highly correlated with known nutrient loadings and trophic condition. As human disturbance increases, fluctuations of stream discharge around the annual mean also increases. Phosphorus content within macrophyte tissues reflected water concentrations, while nitrogen content was related to phosphorus content. Macrophyte standing crop was influenced more by stream morphology than by level of enrichment. As the nutrient loadings increased, deviation of standing crop also increased. The estimation of periphyton production rates via artificial substrata holds promise as a technique for the detection of nutrient rich inputs to streams. Examination of species associations indicated several taxonomic groups of diatoms which appear to be related to water quality. The species diversity of benthic macroinvertebrates was well correlated with level of disturbance. High diversity indices were related to high water quality. Studies of the trout populations in two rivers indicate that there are fewer and larger fish at the more eutrophic sites. Increasing eutrophication is most evident in the growth rate of young-of-the-year fish. (See also W74-02202 thru W74-02204)
W74-02201

SOME LIMNOLOGICAL REMARKS ON LAKE SAIZUCHI-NUMA, YAMAGATA PREFECTURE, (IN JAPANESE),
Yamagata Univ. (Japan). Lab. of Science Education.
H. Kaito.
Jap J Limnol. Vol 33, No 1, p 6-10. 1972. Illus. (English summary).
Identifiers: Chemical stratification, *Japan (Lake Saizuchi-Numa), Lakes, Limnological studies, *Lake stratification, Thermal stratification, *Anaerobic condition.

Lake Saizuchi-numa, situated on the boundary of Mogami and Kitamurayama districts in Yamagata Prefecture (Japan) is considered to be a type of the tectonic lakes from the geological point of view. At the summer stagnation period, thermal as well as chemical stratifications are observed and the anaerobic layer develops near the bottom. The annual observation reveals that the main constituent of the dissolved substances in NaCl which is transported by snow from Japan Sea in winter time. Throughout this season, the sea-breezed salt by monsoon is accumulated in fallen snow which will melt and furnish this lake. This lake is dystrophic.--Copyright 1973, Biological Abstracts, Inc.
W74-02207

COMPUTER SIMULATION OF TROPHIC LEVEL INTERRELATIONSHIPS IN CAYUGA LAKE,
Cornell Univ., Ithaca, N.Y.
R. Plant, R. Lance, and W. Youngs.
Available from the National Technical Information Service as PB-226 105, $3.00 in paper copy, $1.45 in microfiche. Cornell University Water Resources and Marine Sciences Center, Technical Report No. 69, August 1973. 26 p, 9 fig, 3 tab. OWRR A-040-NY (1). 14-31-0001-3832.

Descriptors: *Computer models, Model studies, *Food chains, *Trophic level, Lakes, Lake trout, Phytoplankton, Zooplankton, *New York, *Simulation analysis.
Identifiers: *Cayuga Lake (New York).

An attempt is described to simulate a particular trophic chain in Cayuga Lake. The chain, consisting of phytoplankton, zooplankton, alewives and lake trout, was selected primarily because it is largely independent of other inhabitants of the lake, and represents a complete food chain running from primary producer to final predator. The primary objectives were: (1) to formulate a model displaying a behavior similar to that observed in the species populations in the trophic chain; (2) to test the behavior of this model under variation of its parameters; and (3) to use the model as a guide in developing programs for future research, both theoretical and in the field. As such it was necessary to base the model on theory sufficiently detailed to provide useful information but not so complex as to be mathematically intractable. Based on the field data available, it was decided that the most suitable model was one based on the classical Lotka-Volterra equations (Lotka, 1925). These are a system of interrelated non-linear first order differential equations in which each relevant parameter is represented as a single time dependent variable; while the closed form solution of this system cannot be written explicitly, its behavior has been thoroughly studied (Davis, 1961).
W74-02216

EXPERIMENTAL STUDIES ON PHYTOPLANKTON SUCCESSION IN CAYUGA LAKE,
Cornell Univ., Ithaca, N.Y.
B. J. Peterson, A. E. Savage, and J. P. Barlow.
Available from the National Technical Information Service as PB-226 068, $3.00 in paper copy, $1.45 in microfiche. Cornell University Water Resources and Marine Sciences Center, Technical Report No. 71, 1973. 23 p, 7 fig, 3 tab, 37 ref. OWRR A-035-NY (1). 14-31-0001-3532.

Descriptors: *Phytoplankton, *Succession, Lakes, *Carbon, *Phosphorus, *Nutrients, *New York.
Identifiers: *Cayuga Lake (New York).

Natural phytoplankton assemblages from Cayuga Lake were maintained under controlled nutrient conditions in large volume continuous flow laboratory cultures. Changes in the C:P ratio, rate of carbon uptake per unit carbon, and species composition were followed in nutrient limited chemostats and nutrient sufficient turbidostats. Rates of change of relative abundance and final values for the C:P ratio and rates of carbon uptake per unit carbon are related to parameters describing the lake populations. These comparisons suggest that Cayuga Lake phytoplankton are limited by phosphorus but are rarely phosphorus deficient.
W74-02217

ATTEMPT AT MOLLUSK CONTROL BY INCREASING THE PLANKTONIC BIOMASS AND BY MOLLUSCICIDAL TREATMENT: THE UREA-N-TRITYLMORPHOLINE ASSOCIATION (IN FRENCH),
Institut Tropical Suisse, Basel.
P. Perret, M. Egger, and A. A. Degremont.
Acta Trop, Vol 29, No 2, p 175-181, 1972, English summary.
Identifiers: *Biomass (Plankton), Breeding, Bulinus-sp, *Molluscicidal treatment, *Mollusk control, Schistosoma-haematobium, *Snails, *Urea.

An antisnail molluscicide treatment is described which is based on the simultaneous application of urea and the molluscicide N-tritylmorpholine. When diluted with water the endothermic reaction of urea causes sufficient movement to thoroughly disperse the molluscicide. As a nutritive substance, urea increases the biomass of plankton in such quantity that snail breeding seems to be inhibited. The experiment was done in a reservoir pool which throughout the year contained molluscs of the genus Bulinus, the natural host of Schistosoma haematobium. Earlier attempts to keep the pool free of Bulinus sp. necessitated bimonthly treatment with molluscicides. After the combined application of urea and N-tritylmorpholine the snails were completely absent during a period of 5 mo.--Copyright 1973, Biological Abstracts, Inc.
W74-02226

RELATION OF MINERAL AND HORMONE METABOLISM TO INTAKE OF WATER WITH A HIGH NATURAL CONTENT OF FLUORIDE,
L.L.R.M. Medical Coll., Meerut (India). Dept. of Pathology.
G. K. Tiagi, S. P. S. Teotia, and M. Teotia.
Fluoride. Vol 5, No 4, p 213-219. 1972.
Identifiers: *Fluride, Hormones, *Metabolism (Human), Minerals, *Potable water, Public health, *Calcium absorption.

The metabolic effects of intake of low and high natural fluoride water were studied on 8 subjects over a period of 180 days. In the 4 subjects drinking high fluoride water (10.35 ppm) there was a definite increase in the intestinal absorption of Ca, gradual rise in plasma alkaline phosphatase, and increased retention of Ca as revealed by balance studies. Plasma, Ca, P, Mg, PBI (protein bound iodine), plasma-cortisol and urinary steroids showed no significant change. In the 4 subjects drinking low fluoride water (0.5 ppm) no changes were produced.--Copyright 1973, Biological Abstracts, Inc.
W74-02235

OCCURRENCE OF SAPROCHAETE SACCHAROPHYLA COKER ET SHANOR IN FUNGOID GROWTH BELOW THE DISCHARGE OF BREWERIES, (IN CZECH),
For primary bibliographic entry see Field 05B.
W74-02242

EFFECT OF HEATED WATER FROM KONAKOV HYDRO-ELECTRIC STATION ON OXYGEN CONTENT AND DEVELOPMENT OF PHYTOPLANKTON IN IVAN'KOVSKOE RESERVOIR DURING WINTER, (IN RUSSIAN),
Akademiya Nauk SSSR, Moscow. Institut Biologii Vnutrennykh Vod.
For primary bibliographic entry see Field 05B.
W74-02244

EFFECT OF SUPERNATANT FLUID OF THE ANKISTRO-DESMUS BRAUNII BRUNNTH CULTURE ON DEVELOPMENT OF ALGAE IN WASTE WATERS OF THE CHERNIGOV CHEMICAL FIBER INDUSTRIAL GROUP, (IN UKRAINIAN),
Akademiya Nauk URSR, Kiev. Instytut Botaniki.
H. M. Palamar-Mordvyntseva, and V. V. Stupyna.
Ukr Bot Zh. Vol 29, No 3, p 294-299. 1972. (English summary).
Identifiers: Algae, *Ankistrodesmus-Braunii, *Chemical fiber wastes, Chlamydomonas, Chlorella, Culture, Development, Industrial wastes, Pinnularia, Scenedesmus, Stimulant, *Supernatant fluid, *USSR, Chernigov, Waste waters.

The effect of supernatant fluid of the A. braunii culture on development of algae in waste waters of the Chernigov (USSR) group of chemical fiber enterprises was studied under laboratory conditions. The alga under study apparently excretes into the environment peculiar, physiologically active substances which in small doses stimulate development of wild species of Chlorella, Scenedesmus, Pinnularia and Chlamydomonas. The stimulating and inhibiting effect of the supernatant fluid of the Ankistrodesmus culture is established to depend on the supernatant fluid dose introduced into the medium and Ankistrodesmus growth conditions (age and nutrient conditions of the culture).--Copyright 1973, Biological Abstracts, Inc.
W74-02245

LAKE SARY-CHELEK AND ITS ZOOPLANKTON, (IN RUSSIAN),
Tashkent Univ. (USSR).
For primary bibliographic entry see Field 02H.
W74-02261

MEASURING STRESS IN FISH EXPOSED TO PULP MILL EFFLUENTS,
British Colombia Research Council, Vancouver.
T. E. Howard, and C. C. Walden.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 15-18, 2 tab, 2 fig, 20 ref.

Descriptors: *Bioassay, *Pulp wastes, *Fish physiology, *Toxicity, *Water pollution effects, *Analytical techniques, Industrial wastes, Pollutants, Fish, Respiration, Thermal pollution, Temperature, Pollutant identification.
Identifiers: Sublethal pollution effects, Short-term bioassay, Kraft mills.

Field bioassays of effluent effects on aquatic organisms are costly, time-consuming, and retrospective. Therefore, short-term bioassay techniques have been developed to evaluate responses of fish to pollution loads at sublethal concentrations, as reflected by changes in respiration, swimming ability, temperature tolerance, and blood chemistry. Examples of such short-term bioassays, applied to the evaluation of kraft mill effluent toxicity, are presented. These methods are regarded as complementary to, rather than competitive with, long-term investigations or detailed ecological studies. (See also W74-02273) (Brown-IPC)
W74-02276

LABORATORY AND CONTROLLED EXPERIMENTAL STREAM STUDIES OF THE EFFECTS OF KRAFT EFFLUENTS ON GROWTH AND PRODUCTION OF SALMONID FISH,
Oregon State Univ., Corvallis.
C. E. Warren, W. K. Seim, R. O. Blosser, A. L. Caron, and E. L. Owens.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 19-26, 10 fig, 18 ref.

Descriptors: *Toxicity, *Pulp wastes, *Fish, *Water pollution effects, Salmon, Trout, Aquaria, Biochemical oxygen demand, Aquatic organisms, Algae, Insects, Effluents, Industrial wastes, Pulp and paper industry.
Identifiers: Kraft mills.

Based on results of a six-year study, neither primary- nor secondary-treated kraft mill effluents impaired the growth of salmonid fish (coho and Chinook salmons, and brown and cutthroat trouts) in aquaria at BOD concentrations below 0.5 g/liter, but did affect the fish at higher concentrations. In laboratory stream communities and experimental stream channels, these effluents had no deleterious effects on salmonid growth and biomass production at BOD concentrations of 0.5 mg/liter, but did change the composition of the benthic community of algae and insects. At the same BOD concentrations, effluents from another kraft mill exerted less effect on aquarial salmonids than those from the first mill studied. (See also W74-02273) (Brown-IPC)
W74-02277

EFFECT OF IRRIGATION, FERTILIZATION, AND OTHER CULTURAL PRACTICES ON WATER QUALITY,
Idaho Univ., Moscow. Water Resources Research Inst.
D. V. Naylor, and J. R. Busch.
Available from the National Technical Information Service as PB-226 113, $3.00 in paper copy, $1.45 in microfiche. Completion Report, September 1973. 19 p, 1 fig, 3 ref. OWRR A-036-IDA (1). 14-01-001-3512.

Descriptors: *Furrow irrigation, Surface runoff, Groundwater, *Nutrients, Solids, Computer models, Water balance, Sugar beets, Beans, Onions, Nitrogen, *Fertilizers, Sediments, *Idaho, Water quality, Computer programs, Phosphorus, Sedimentation basins (Waste disposal).
Identifiers: *Boise Valley (Idaho), Sediment ponds.

A farming unit in an intensively cropped, furrow irrigated agricultural area of the Boise Valley in southwestern Idaho was instrumented for two cropping seasons to measure the quantities of water entering and leaving the area. Surface and groundwater samples taken from the unit were analyzed for nutrient and solids content. A computer program was developed and used to compute a nutrient, total solids and water budget for the unit based on water measurements, climatic measurements, cropping data and chemical analyses. Excessive amounts of water applied to onion crops were responsible for a portion of the applied water entering the groundwater through deep percolation carrying with it part of the nitrogen applied as fertilizer. However, the other crops, sugar beets and beans, were found to use shallow groundwater for part of their consumptive use requirements. The only materials which were lost from the farm in appreciable quantities in the surface runoff were total solids and the associated phosphorous except when nitrogen was added to the irrigation water as fertilizer. Sediment ponds installed on the farm were found to be effective in removing sediments and phosphorous from the surface runoff.
W74-02321

A TECHNIQUE FOR EVALUATING ALGAL GROWTH POTENTIAL IN ILLINOIS SURFACE WATERS,
Illinois State Water Survey, Urbana.
W. C. Wang, W. T. Sullivan, and R. L. Evans.
Report of Investigation 72, 1973. 16 p, 21 fig, 10 tab, 37 ref.

Descriptors: *Algae, *Eutrophication, *Analytical techniques, *Illinois, Analysis, Fluorescence, Spectophotomery, Alkalinity, Hardness (Water), Laboratory tests. Testing procedures, Pollutant identification, Biomass.
Identifiers: *Algal growth potential.

Various techniques were used to measure the algal growth potential (AGP) of Illinois surface waters. The AGP is defined as the algal or organic mass resulting from a 7-day incubation of a culture grown on a natural water substrate under standardized laboratory conditions and expressed as milligrams of dry organic matter per liter of sample. This definition resulted from the measurement of algal growth in 155 samples from 3 lakes, 4 streams and 2 sewage sources. The process involves measuring changes of light absorption, fluorescence of algal pigments, filterable organic and inorganic mass, total alkalinity, and hardness. Analysis showed filterable organic mass to be the most reliable criterion for quantifying algal growth. The AGP of water and sewage samples were found to vary from between 12 mg/l for water from Lake Eureka to 120 mg/l for raw sewage and 135 mg/l for water from a tertiary effluent sewage pond. The development of the AGP parameter will provide a new diagnostic tool for planning and managing water resources, as it indicates the potential for eutrophication, although the relationship of the AGP and observed nutrient levels is uncertain at present. (Poertner)
W74-02342

DISSIPATION AND PHYTOTOXICITY OF DICAMBA RESIDUES IN WATER,
Texas A and M Univ., College Station. Dept. of Range Science.
For primary bibliographic entry see Field 05B.
W74-02370

ACCUMULATION OF FOSSIL CO2 IN THE ATMOSPHERE AND THE SEA,
Institute of Nuclear Sciences, Lower Hutt (New Zealand).
A. W. Fairhall.
Nature, Vol 245, No 5419, p 20-23, September 7, 1973. 4 fig, 15 ref.

Descriptors: *Mathematical models, *Carbon dioxide, *Water pollution effects, *Mollusks, *Calcium carbonate, *Sea water, *Fossil fuels, Equations, Oceans, Reefs, Path of pollutants, Air pollution effects, Forecasting, Corals.

A model showing the relationship between the accumulation of CO2 in the atmosphere from fossil fuels and the levels in the sea predicts that the rapid increase in atmospheric CO2 will cause the sea to become undersaturated in CaCO3. The possible result of this undersaturation is that coral reefs and shells of organisms would tend to dissolve. The model is based on the premise that the long lived terrestrial biosphere and humus are not significant sinks for fossil CO2 emissions. The predictions of the model remain to be validated and the effect of undersaturation of CaCO3 on calcareous organisms is not presently known. (Little-Battelle)
W74-02375

CURRENT STATUS OF THE ENVIRONMENTAL AND HUMAN SAFETY ASPECTS OF NITRILOTRIACETIC ACID (NTA),
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 05B.
W74-02394

FREQUENCY OF FISH TUMORS FOUND IN A POLLUTED WATERSHED AS COMPARED TO NONPOLLUTED CANADIAN WATERS,
Chicago Medical School, Ill. Dept. of Microbiology.
E. R. Brown, J. J. Hazdra, L. Keith, I. Greenspan, and J. B. G. Kwapinski.
Cancer Res, Vol 33, No 2, p 189-198, 1973, Illus.
Identifiers: Arsenic, Bacteria, Benzanthracene, *Illinois (Fox River), Carbons, Carcinogens, Chlorinated hydrocarbons, Coliform, Crude oil, *Fish tumors, Gasoline, Hydro, Lead, Mercury, Nonpolluted waters, Phosphates, Polluted waters, Rivers, Sulfates, Toluene, Tumors, Watersheds.

Data are presented on the incidence of tumors found in 2121 fish examined from the Fox River watershed (4.38%) as compared to 4939 fish examined in Canada (1.03%). The water systems were compared as to pollution potentials, and the Fox River was found to be a highly polluted system. Among the pollutants found were Hg, Pb, As, toluene, crude oil, gasoline, benzanthracene, chlorinated hydrocarbons, phosphates, sulfates and coliform bacteria. Factors such as dissolved O2 content, temperature and nutritional variation were considered similar in both water systems. It is concluded that these pollutants were responsible for the greater frequency of tumors. No attempts were made to determine the effects of pollution of the long term human users of the water or to determine the virus contents of the water system under study.--Copyright 1973, Biological Abstracts, Inc.
W74-02401

ISOLATION AND CLEANUP OF ORGANOPHOSPHORUS INSECTICIDES AND THEIR OXONES FROM ANIMAL TISSUES,
Institute of Industrial Hygiene and Occupational Diseases, Bratislava (Czechoslovakia).
For primary bibliographic entry see Field 05A.
W74-02403

IRON, ZINC, MAGNESIUM, AND COPPER CONCENTRATIONS IN BODY MEAT OF THE BLUE CRAB, CALLINECTES SAPIDUS,
Maryland Univ., Solomons. Natural Resources Inst.

For primary bibliographic entry see Field 05A.
W74-02409

CHLORINATION EFFECTS ON ORGANIC CONSTITUENTS IN EFFLUENTS FROM DOMESTIC SANITARY SEWAGE TREATMENT PLANTS,
Oak Ridge National Lab., Tenn.
R. L. Jolley.
Report No ORNL-TM-4290, October 1973. 342 p, 29 fig, 52 tab, 396 ref, 7 append. W-7405-eng-26.

Descriptors: *Chlorination, *Organic compounds, *Radioactivity techniques, *Sewage treatment, Sewage effluents, *Domestic wastes, Chlorine, Methodology, Environmental effects, Sampling, Chemical reactions, Anion exchange, Aqueous solutions, Separation techniques, Laboratory tests, Laboratory equipment, Cation exchange, Tracers, Organic acids, Phenols, Waste treatment, Pollutant identification, Chemical analysis, Surveys.
Identifiers: *Ion exchange chromatography, *Chlorinated hydrocarbons, Synthetic sewage effluents, Chlorine residual, Characterization, Chemical concentration, Sample preparation, Cl-36, Chloramines, 2-Chlorobenzoic acid, 3-Chlorobenzoic acid, 4-Chlorobenzoic acid, 8-Chlorocaffeine, 6-Chloroguanine, 3-Chloro-4-hydroxybenzoic acid, 4-Chloromandelic acid, 4-Chloro-3-methylphenol, 2-Chlorophenol, 3-Chlorophenol, 4-Chlorophenol, 4-Chloropheylacetic acid, 4-Chlororesorcinol, 5-Chlorosalicylic acid, 5-Chlorouracil, 5-Chlorouridine, 8-Chloroxanthine, Dichloramine, Hypochlorite.

The major objectives were to develop a method for examining chlorination effects and to determine whether, as well as to what extent chlorine-containing organic compounds are formed when effluents from domestic sanitary sewage treatment plants are chlorinated at milligram-per-liter chlorine concentrations. An additional purpose was to characterize, or identify, and quantify stable chlorine-containing and other organic compounds in chlorinated and unchlorinated effluents. Chlorination yields were approximately the same for both primary and secondary effluents. Essentially the same effects were obtained by chlorination with either chlorine gas or hypochlorite solution. The effects of chlorination in the chlorinated effluents were determined by a method which coupled chlorination by Cl-36 radioactive tracer with separation by high-resolution anion-exchange chromatography using sensitive radioactive tracer monitoring. It was determined that chlorine-containing stable organic constituents are present after chlorination of effluents from domestic sanitary sewage treatment plants. Over 50 chlorine-containing constituents were separated from chlorinated secondary effluents. Seventeen of these chlorine-containing organic compounds were tentatively identified and quantified at the 0.5- to 4.3- microgram/liter level. In addition to the 17 chlorine-containing compounds that were identified, 32 stable organic constituents were identified and 23 of these were quantified at 2- to 190-microgram/liter levels in the effluents from domestic sanitary primary sewage treatment plants. Nine stable organic constituents were identified, and eight of these were quantified at 5- to 90-microgram/liter levels in the effluents from domestic sanitary secondary sewage treatment plants. (Holoman-Battelle)
W74-02416

MERCURY IN FISH, SEDIMENTS, AND WATER IN LAKE OAHE, SOUTH DAKOTA,
Environmental Protection Agency, Kansas City, Mo. Region VII.
For primary bibliographic entry see Field 05A.
W74-02423

TOXAPHENE ACCUMULATION IN FISH IN LAKES TREATED FOR ROUGH FISH CONTROL,
Wisconsin Univ., Madison.
R. A. Hughes, and G. F. Lee.
Environmental Science and Technology, Vol 7, No 10, p 934-939, October 1973. 4 fig, 2 tab, 26 ref.

Descriptors: *Pesticide residues, *Pesticide toxicity, Pesticide kinetics, *Pollutant identification, *Water pollution effects, Chemical analysis, Persistence, Water analysis, Water properties, Chlorinated hydrocarbon pesticides, Plankton, Fish stocking, Freshwater fish, Absorption, Rough fish, Physical properties, Chemical properties, Sunfishes, Path of pollutants, Walleye, Weight.
Identifiers: *Bioaccumulation, *Toxaphene, Fate of pollutants, Fat tissue, Sample preparation, Animal tissues, Electron capture gas chromatography, Thin layer chromatography, Fox Lake, Comstock Lake, Ottman Lake, Kusel Lake, Green sunfish, Biological magnification.

The results are presented of a study which covered the decline of toxaphene in treated lakes; the extent of toxaphene residue uptake by stocked fish; and the toxicity of 'aged' toxaphene residues compared to that of the standard mixture. Previously described methods for extracting, cleaning up and estimating toxaphene residues in aquatic samples were used. Electron capture gas chromatography was used to identify the pesticide and its presence in samples was confirmed by thin-layer chromatography. Fish, stocked in lakes retaining in the water very small amounts of toxaphene and plankton, accumulated residual toxaphene while maintaining excellent growth and reproducing successfully. Both stocked and hatched bluegills eliminated accumulated residues while maintaining excellent growth. Edible flesh of bluegills contained less than 10 percent of the whole body burden of toxaphene residues, and substantial portions of residues were removed by pan frying. Significant correlations were noted between accumulated toxaphene residue and fat content of stocked bluegills. Toxaphene and toxaphene residue accumulation were more closely related to fat content than to fish weight. Bluegills killed in lake treatment projects accumulated concentrations of toxaphene lower than concentrations of toxaphene residues found in stocked bluegills. Accumulated toxaphene in killed bluegills correlated well with fat content of the fish. Based on the changes in the toxaphene signature in gas chromatography, it is proposed that there is a partial degradation of some of the more toxic components of toxaphene. (Holoman-Battelle)
W74-02425

THE SPREADING OF HEAVY METALS IN FLOWING WATERS IN THE REGION OF OCCURRENCE OF NATURAL DEPOSITS AND OF THE ZINC AND LEAD INDUSTRY. (ROZPRZESTRZENIENIE METALI CIEZKICH W WODACH PLYNACYCH W REJONIE WYSTEPOWANIA NATURALNYCH ZLOZ ORAZ PRZEMYSLU CYNKU I OLOWIU),
Polish Academy of Sciences, Krakow. Zaklad Biologii Wod.
For primary bibliographic entry see Field 05B.
W74-02435

THE INFLUENCE OF ORGANIC DECOMPOSITION ON CARBON DIOXIDE HYDROGEN SULFIDE, DISSOLVED OXYGEN, AND ALGAE GROWTH IN THE DWORSHAK RESERVOIR,
Idaho Univ., Moscow. Dept. of Bacteriology and Biochemistry.
A. J. Lingg.
Available from the National Technical Information Service as PB-226 252 $3.00 in paper copy, $1.45 in microfiche. University of Idaho, Moscow, Water Resources Research Institute Technical Completion Report, November 1973. 32 p, 15 fig, 1 tab, 12 ref. OWRR A-033-IDA (1).

Descriptors: Bacteria, *Carbon dioxide, *Decomposing, Water Quality, Reservoirs, Impoundment, *Hydrogen sulfide, *Idaho, *Dissolved oxygen, *Entroplication.
Identifiers: *Dworshak Reservoir (Ida), Clearwater River (Ida), Carbon prediction, *Algal growth.

In order to meet the increased demands on domestic, industrial and recreational water supply, it is necessary to maintain, and in many cases to upgrade, the quality of water resources. In order to accomplish these tasks, it is paramount to fully understand those factors, natural and artificial, which lead to accelerated deterioration of rivers, lakes and streams. Rampant eutrophication leading to massive algal blooms, anaerobic conditions and other undesirable qualities have been rapidly increasing for the last century. This project was designed to explore the role played by carbon and its subsequent use by bacteria on various chemical and biological parameters in Dworshak reservoir. Carbon contribution to the to the reservoir is primarily from the existing organic materials present on the preimpoundment floor. This study defines methodology enabling prediction of the levels of carbon in a reservoir prior to impoundment and explores some of the effects of that carbon. In addition, these methods can be used to determine the amount of leached carbon, readily useable, by heterotrophic bacteria. The effect of carbon utilization by bacteria on algal growth is also explored. In the laboratory this symbiotic effect leads to significant increases in algal biomass even at carbon levels as low as 1.3 ppm. The implication of this observation is that carbon can greatly stimulate algal growth rates and consequently algal blooms if made available by bacterial respiration.
W74-02444

MICROBIAL ND CHEMICAL STUDIES IN A WATERSHED USED FOR MUNICIPAL SUPPLY AND WASTE DISPOSAL,
Montana State Univ., Bozeman. Dept. of Microbiology.
W. G. Walter, and J. J. Jezeski.
Available from the National Technical Information Service as PB-226 240 $3.00 in paper copy, $1.45 in microfiche. Montana University Joint Water Resources Research Center Bozeman Report No. 41 (1973) 27 p, 12 fig, 6 tab, 12 ref. OWRR B-035-MONT (1).

Descriptors: *Microbiology, Pollution, Microenviron, ent, *Microorganisms, *Water quality, *Bioindicators, *Montana, Water pollution effects, Watershed management, Waste disposal, Municipal water.
Identifiers: *East Gallatin River (Mont.), Microbial studies.

The objectives of this research were: to determine the effects of recreational activities, wild life cloppings and logging on quality of water intended for municipal supplies; to evaluate the contribution of various factors to the wastewater burden of the East Gallatin River; to determine the survival indicator organisms under the various water conditions in the Bozeman Creek-East Gallatin water course; and to further the training of personnel in this type of research. (Holje-Montana)
W74-02449

WATER RESOURCES DEVELOPMENT IN THE MULLICA RIVER BASIN,
College of South Jersey, Camden. Dept. of Zoology.
J. B. Durand, L. Granstrom, and N. S. Rudolph.
Available from the National Technical Information Service as PB-226 239 $3.00 in paper copy, $1.45 in microfiche. Water Resources Research Institute, Rutgers-The State University of New Jersey, Report 20 p, September 1973. 4 fig, 1 tab, 4 ref. OWRR B-014-N.J (4), B- -N.J., A-018-N.J. (4).

Descriptors: *Aquatic habitats, *Environmental effects, *Water supply development, *Conjunctive use, *Systems analysis, Aquatic environment, Estuarine environment, Ecology, Limiting factors, Water yield, Dependable supply, Groundwater, Potential water supply, Surface water availability, Linear programming, *Salinity, Streamflow, *New Jersey, Withdrawl.
Identifiers: *Mullica River Basin (NJ).

The potential withdrawal of water from the Mullica River-Great Bay Estuary in southern New Jersey prompted a joint study by biologists and engineers to determine the maximum supply of water that could be diverted from the basin without causing undue environmental impacts. The effect of removal of water from the basin over long periods of time was simulated by review of records of a severe drought. Based on analysis of streamflows and salinities during these drought conditions, minimum mean monthly streamflow were determined corresponding to the maximum salinities tolerable by the fish and shellfish communities, important sources of revenue and recreation in the region. A physically optimized, chance constrained linear programming model was developed for the conjunctive use of ground and surface waters. Adjusting water withdrawal from streamflow and groundwater sources according to physical and seasonal criteria would permit substantial use of the basins's resources, with no additional burden on the ecology of the estuary.
W74-02450

A STUDY OF THE FACTORS DETERMINING THE OXYGEN UPTAKE OF BENTHAL STREAM DEPOSITS,
Rutgers - The State Univ., New Brunswick, N.J. Dept. of Environmental Sciences.
J. V. Hunter, M. A. Hartnett, and A. P. Cryan.
Available from the National Technical Information Service as PB-226 238, $3.00 in paper copy, $1.45 in microfiche. Water Resources Research Institute, Rutgers The State University of New Jersey Report, October 1973. 27 p, 2 fig, 9 tab, 15 ref. OWRR B-022-NJ (7) 14-31-0001-3107.

Descriptors: *Benthos, *Benthic fauna, *Biochemical oxygen demand, Oxygen demand, Organic wastes, Pollutants.
Identifiers: *Benthal oxygen demand, Tubificid worms.

The object was to investigate different observed values of benthal oxygen demand and to determine their relationship to various conditions and circumstances. The study showed little correlation between the concentrations and nature of the benthic organics and the benthal oxygen damand of the deposit. However, there was a correlation between the benthic macro-invertebrate population (bubificid worms) and the benthal oxygen demand, which is also supported by some conclusions reached by other investigators. Although the mechanism of this demand is not clear, it seems that it is for larger than that which would be due solely to the respiration of the organisms. The high oxygen demand associated with the worm populations indicates why the present investigation and other researchers have failed to correlate benthal demand with the chemical composition of the deposits. If as it appears, the influence of the worms raises the demand to a level up to six times the demand without the worms, the relaively small difference in the demands caused by organic contents would not be obvious. (Whipple-New Jersey)
W74-02451

DEBRECEN AREA INLAND WATERS: HYDROBIOLOGICAL APPROACH: INFLUENCE ON WATER QUALITY OF MAIN EASTERN IRRIGATION CANAL WITH REFERENCE TO DEBRECEN'S DRINKING AND INDUSTRIAL WATER SUPPLY,
Lajos Kossuth Univ., Debrecen (Hungary). Zoological Inst.
G. Devai.
Arch Hydrobiol, Vol 70, No 2, p 206-209, 1972, Illus, English summary.
Identifiers: Canals, Cladocera, Copepoda, *Hungary (Debrecen), Hydrobiological studies, *Industrial water, Inland waters, *Irrigation canals, Rotatoria, *Water quality, Potable water.

The ecological and hydrobiological characteristics and the water quality of the inland waters along the Main Eastern Irrigation Canal (Keletifocsatorna) Hungary were examined. Their effect on the waters of the Canal was established through ecological (geographical, meteorological, hydrological, water-chemical, phytocenological) and zooplankton (Rotatoria, Cladocera, Copepoda) surveys.--Copyright 1973, Biological Abstracts, Inc.
W74-02543

CLEANLINESS OF WELLS, CHEMICAL SUBSTANCES IN DRINKING WATER AND THEIR RELATION TO CARIES (IN POLISH),
E. Wojtowicz, A. Macura, and R. Kwiatek.
Rocz Panstw Zakl Hig, Vol 23, No 1, p 15-21, 1972, English summary.
Identifiers: *Caries (Human), Chemicals, Cleanliness, *Water wells, Potable water, *Poland (Raba River valley), *Urochrome.

Two localities (A and B) lying in the Raba River Valley in Poland, were included in the study. In A, the prevalence of caries was 75%, but in B it amounted to 35% of the population. In locality A, 92% of the inhabitants had running water; in B, wells were the only source of drinking water. The water from wells was contaminated with urochrome, as judged from a high N content, large numbers of bacteria, and high O absorption. A relationship between urochrome contents in drinking water and the prevalence of caries was suggested.--Copyright 1973, Biological Abstracts, Inc.
W74-02544

ON MALLOMONAS LELYMEME HARRIS ET BRADLEY (CHRYSOPHYCEAE), (IN JAPANESE),
Kobe Univ. (Japan). Dept. of Biology.
For primary bibliographic entry see Field 02H.
W74-02550

THE EFFECT OF ORGANIC SUBSTRATES ON THE ABUNDANCE OF BACTERIA IN THE WATER OF 5 MASURIAN LAKES,
Polish Academy of Sciences, Warsaw. Inst. of Ecology.
W. A. Godlewsha-Lipowa.
Bull Acad Pol Sci Ser Sci Biol. Vol 20, No 9, p 647-651. 1972. Illus.
Identifiers: Abundance, *Bacteria, Lakes, Masurian lakes, Organic substrates, *Poland, Water pollution.

The effect of organic substances on the abundance of bacterial communities in water of a few Masurian lakes, Poland, of a varying trophism were examined. The population considerably increased after the addition of bactopepton. With increasing trophism, the percentage of the increasing bacterial number and the number of bacterial generations decreased. Due to the application of glucose and glucose with P, distinct stimulation of bacterial development was observed in lakes of a lower trophism, whereas starch visibly affected only Lake Sniardwy.--Copyright 1973, Biological Abstracts, Inc.
W74-02556

COMPARATIVE PRODUCTIVITY STUDIES OF THREE MECKLENBURG LAKES (LAKE KUMMEROW, LAKE TETEROW AND LAKE MALCHIN), (IN GERMAN),
Rostock Univ. (East Germany). Institut fuer Hygiene.
For primary bibliographic entry see Field 02H.
W74-02558

STUDIES OF THE SINKING PLUME PHENOMENON,
Argonne National Lab., Ill. Center for Environmental Studies.
B. Hoglund, and S. A. Spigarelli.
Paper presented at Fifteenth Conference on Great Lakes Research 1972, Madison, Wisconsin, April 5-7, 1972. 16 p, 6 fig, 9 ref.

Descriptors: *Wisconsin, *Thermal pollution, *Lake Michigan, Lakes, Fish management, Insect eggs, Water temperature, *Nuclear power plants, Heated water, *Water pollution sources, *Environmental effects.
Identifiers: Sinking plumes.

The phenomenon of a 'sinking plume' was observed during March and April, 1971, at the Point Beach Nuclear Power Plant, Two Creeks, Wisconsin. Temperature recorders were placed on the bottom of Lake Michigan near the outfall of the plant. Analysis of the data revealed the warm water did interact with the bottom as long as the lake temperature was 4C or less. When the ambient temperature exceeded 4C, there was little indication of temperature perturbations on the bottom as a result of the thermal discharge. The maximum Delta T observed at the nearest thermograph (335 meters) was 5.2C. The maximum Delta T observed at 1,525 meters from the discharge was 2.6C. Ambient temperatures at 1,525 meters from the discharge were observed to vary by 2C. The data are presented in terms of the percentage of time the various instruments were influenced by the thermal plume. Biological implications of the 'sinking plume' with respect to premature hatching of fish and insect eggs and with respect to the viability of young fish are discussed. (Sinha-OEIS)
W74-02644

RESEARCH PERTINENT TO ENVIRONMENTAL QUALITY CONCERNING THE PERIOD, 1967-1971.
Woods Hole Oceanographic Institution, Mass.
For primary bibliographic entry see Field 02L.
W74-02648

5D. Waste Treatment Processes

TWO ENVIRONMENTAL ANALYSES INVOLVING AGRICULTURE,
Illinois Univ., Urbana.
For primary bibliographic entry see Field 05B.
W74-02166

QUICK-TIME INSTRUMENTAL MEASUREMENTS OF WASTEWATER ORGANIC CHARACTERISTICS,
Connecticut Univ., Storrs. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05A.
W74-02170

TREATMENT OF TANNERY EFFLUENTS BY PHYSICAL-CHEMICAL PROCESSES,
Calspan Corp., Buffalo, N.Y.
L. K. Wang, D. B. Dahm, R. E. Baier, and R. C. Ziegler.
Technical Paper presented at the 45th Annual Conference of the Water Pollution Control Federation, Atlanta, Georgia, October 1972. 36 p, 9 tab, 5 fig, 14 ref.

Descriptors: *Waste water treatment, *Tannery wastes, *Foam separation, Colloids, *Flotation, Carbon, *Adsorption, Surfactants, Suspended solids, Industrial wastes.
Identifiers: Surface adsorption.

A new unit process, adsorption-flotation, was found efficient for removing both dissolved organics and suspended solids. High removal was achieved by using powdered activated carbon to

adsorb most of the dissolved organic molecules in an aeration column containing tannery waste, then using a surfactant as a collector to remove residual organics, activated carbon, and other solid particles with rising bubbles. With the adsorption flotation followed by sedimentation, the fractional reductions of suspended solids, turbidity, color, protein, tannin, cyanide, and chemical oxygen demand were found to be all in excess of 0.9. Reductions of sulfide and chromium by pH adjustments with sulfuric acid and lime, respectively, were also demonstrated experimentally. The new adsorption flotation process could be a potential method for treating many industrial effluents; however, it is economically unfeasible for treating tannery waste.
W74-02175

MATHEMATICAL RELATIONSHIPS OF BOD REMOVAL IN ACTIVATED SLUDGE PROCESS,
Calspan Corp., Buffalo, N.Y.
L. K. Wang, and M. H. Wang.
Civil Engineering Bulletin, National Cheng Kung Univ., Volume 10, May 1969, p 81-85.

Descriptors: *Waste water treatment, *Activated sludge, Mathematical models, *Biochemical oxygen demand, Recycling, Kinetics, *Sludge treatment.
Identifiers: Complete mix, Batch system, Continuous system, Sludge recycle, Sludge yield.

Kinetics of completely mixed activated sludge process were reviewed, assessed and summarized. Based on the materials balances for the substrate and the sludge in an activated sludge reactor, the mathematical equations of substrate removal rate, sludge growth rate, and critical dilution rate can be derived for a continuous activated sludge process with or without recirculation. The behavior of an activated sludge continuous flow system can be logically predicted for any combination of initial substrate concentration, volumetric feedback ratio, cell concentration factor, and dilution ratio if the maximum sludge growth rate, the cell yield coefficient, and the saturation constant are known.
W74-02176

COST EFFECTIVENESS IN POLLUTION CONTROL--TREATMENT OF GLUE FACTORY WASTES BY CARBON ADSORPTION SYSTEM,
Calspan Corp., Buffalo, N.Y.
L. K. Wang, R. P. Leonard, D. B. Dahm, R. C. Ziegler, and R. E. Baier.
Proceedings of the Fifth Annual Northeastern Regional Antipollution Conference, University of Rhode Island, R.I., 1972. p 87-114. 10 tab, 4 fig, 10 ref.

Descriptors: Estimated costs, Costs, *Waste water treatment, Activated carbon, Adsorption, Coagulation, Industrial wastes, Physiochemical properties.
Identifiers: Powdered carbon, Organic coagulant, Dissolved protein, Glue factory wastes.

In an animal glue plant, the two waste streams of greatest concern are the alkaline waste containing lime, protein, blood, and dirt from the lime curing and washing operations, and the acid waste containing sulfuric acid, chromium sulfate, dissolved organics, and hydrochloric acid from the acid treatment, washing, and neutralization operations. There has been little success in developing adequate and economical methods for the abatement of glue factory pollutant discharges. A two-stage powdered carbon adsorption system dosing 2,000 mg/l of carbon for each stage would satisfy the present New York effluent standards. The secondary treatment cost would be about 30 cents per thousand gallons (or about $900 per day). If a tertiary sand filtration process is included, there would be an additional 10.1 cents per thousand gallons (or about $300 per day) cost.
W74-02177

IN SITU TREATMENT METHODS FOR HAZARDOUS MATERIAL SPILLS,
Calspan Corp, Buffalo, N.Y.
R. C. Ziegler, and J. P. Lafornara.
Proc. of National Conference on Control of Hazardous Material Spills, March 1972. 49 p, 10 fig, 9 tab. EPA 68-01-0110.

Descriptors: Lakes, *Waste water treatment, *Carbon, *Adsorption, *Flotation, Neutralization, Chemical precipitation, *Heavy metals, Ammonia, Chlorine, Activated carbon.
Identifiers: Organic pollutants, Granular carbon, Sodium sulfide, *Hazardous materials spills.

Several methods for coping with water and land spills of hazardous materials are discussed. For water spills of heavy metals, treatment with sodium sulfide to form a sulfide precipitate is described. Laboratory and field data are presented which illustrate the general utility of this method. Methods are suggested for neutralizing spills of ammonia and chlorine. For treating water spills of certain organic pollutants and heavy metal salts, adsorption by activated carbon is shown to be promising. Data are presented on the effects of pollutant concentration on carbon adsorption efficiency. Flotation techniques for retrieving powdered activated carbon from the treated water are described, and the use of granular activated carbon in porous bags is considered as a means for overcoming the disadvantages of introducing carbon directly into the bulk water. Methods are available for controlling land spills of hazardous materials by treating the ground surface to prevent penetration and by gelling or congealing spilled liquids to immobilize them.
W74-02179

WATER AND SEWERAGE IMPROVEMENTS NEEDED IN 1975 IN CHATHAM COUNTY, GEORGIA.
Chatham County-Savannah Metropolitan Planning Commission, Savannah, Ga.

February 1970. 115 p, 28 fig, 2 tab. HUD P-128, Urban Planning Grant.

Descriptors: *Planning, *Construction costs, Water supply, Water distribution, Waste water disposal, *Sewerage, Grants, *Georgia.
Identifiers: Urban water resource systems, Utility extensions, *Savannah (Geo), Chatham County (Geo).

Specific water supply and sewerage system improvements and their costs for Chatham County are presented. The report is the third in a series of planning studies which included a general program of water pollution abatement and water service extension for the county. The emphasis is on the specific costs and means of payment for each proposed improvement in each service area. Most of the report consists of tables listing the improvements and their costs. Some of the means for payments proposed are HUD grants, FWPCA grants (now EPA), and revenue bonds. The tables of improvements are organized to show which elements are eligible for federal grants. The report covers the period 1970 to 1975. (Elfers-North Carolina)
W74-02186

THE USE OF POWER PLANT HEAT IN A PHYSICAL-CHEMICAL DOMESTIC WASTE-WATER RENOVATION SYSTEM,
Arizona Univ., Tucson. Dept. of Civil Engineering and Engineering Mechanics.
R. A. Sierka, and R. A. Fazzolare.
Available from NTIS as PB-226 141 $3.75 in paper copy, $1.45 in microfiche. Paper presented at National Conference on Complete Water Reuse, April 23-27, 1973, Washington, DC. Sponsored by American Institute of Chemical Engineers and Environmental Protection Agency. 28 p, 12 fig, 4 tab, 5 ref. OWRR-A-028-ARIZ (1). 14-31-0001-3503.

Descriptors: *Waste water treatment, *Sewage treatment, Reclaimed water, *Nuclear powerplants, Heated water, *Thermal pollution, Recycling.
Identifiers: *Heated sewage.

Seventy percent of the energy produced in a nuclear power reactor is rejected to the environment as low quality waste heat. One possible use of this heat source is for domestic wastewater treatment. This study examines a ferric-chloride, powdered activated carbon physical-chemical system in a one-step process as a function of temperature (20 deg-80 deg C) with COD, suspended solids, turbidity, and phosphorus removals used to monitor performance. Significant improvement in removal is obtained at higher temperatures with optimum results between 50 deg C and 60 deg C. Since urban wastewater flow and electric power usage are population-dependent and the system optimum treatment temperature coincides with waste heat characteristics, a combined power plant-wastewater system would generate recycleable water.
W74-02208

OPTIMUM DESIGN PERIOD FOR WATER POLLUTION CONTROL PLANTS,
H. C. Blersch.
Journal of the Institute of Water Pollution Control, Vol 72, No 2, p 223-226, 1973. 1 fig, 1 tab.

Descriptors: *Water pollution control, *Treatment facilities, *Design, *Long-term planning, *Evaluation, Economics, Capital, Investment, Decision making, Optimal development plans.
Identifiers: Ultimate design period, Stage design period, *South Africa.

This article extends the conclusions drawn by Zeperin in his contribution to the IAWRR Design Workshop in Vienna in 1971, concerning the optimum design period for water pollution control plants, by examining a series of hypothetical situations to determine whether any rule can be established which has a general application in the divergent conditions found in the South African context. The implication of long-term provision in basic planning varies widely among different situations, thus barring a quantitative generalization. Required essentially is that the implications be identified and evaluated as far into the future as possible, since the longer-term consequences of faulty, short-sighted planning may easily be out of all proportion to the immediate cost differences. Considered herein in detail are: (1) the ultimate design period, or life, of a plant which the designer should anticipate and provide for; and (2) the stage design period, the period for which the given stage of the works should be designed to serve before an extension becomes necessary. It is concluded that each case should be examined on its own merits, and in such examination it will be important that estimated costs for modules of various sizes and for basic and re-establishment costs are of relatively high accuracy in relation to one another. (Bell-Cornell)
W74-02222

COST EFFECTIVENESS OF CURRENT ENVIRONMENTAL ENGINEERING PRACTICES,
Camp, Dresser and McKee, Boston, Mass.
R. C. Marini.
Water and Sewage Works, Vol 120, No 4, p R-21-R-28, April 1973.

Descriptors: *Environmental engineering, *Water pollution control, *Economic efficiency, *Optimum development plans, Costs, Mathematical models, Computer programs, Water quality, Dissolved oxygen, Construction, Management, Industrial wastes, Surveys, Systems analysis.
Identifiers: *Cost-effectiveness, Social benefits.

Large public sums will be spent on water pollution control, thus it is imperative to look at the cost effectiveness of current practices in environmental engineering. The most effective way to minimize costs is to plan and compare the costs and functional effectiveness of all available alternatives, including some alternatives that involve social and political considerations which may not be completely effective. The eight principal steps involved in developing optimum solutions to environmental engineering problems are given. Pilot plants, computers and mathematical models, industrial waste surveys, and construction management, four practices which are useful tools in implementing the principal steps, are discussed and case examples of their application are described. Pilot plant studies are conducted as a means for developing design factors and optimizing total costs for ultimate full-scale plants. A systems method relating cost to water quality has been derived, comprised of an economic, dissolved oxygen model and two computer programs (mixed integer and simulation). Industrial waste surveys are effective cost-saving tools for collecting data, in view of the increasing use of computers. Finally, the consulting engineer for, a wastewater treatment project should be its construction manager since he most freely and objectively can select the most economic and efficient equipment and practices. (Bell-Cornell)
W74-02225

MANUFACTURE OF CAPACITOR PAPER -- SOME PROBLEMS WITH FRESH WATER PREPARATION, (ERZEUGUNG VON KONDENSATORPAPIER -- EINIGE PROBLEME BEI DER FRISCHWASSERHERSTELLUNG),
O. Riessner.
Zellstoff und Papier, Vol 21, No 7, p 200-204, July 1972. 5 tab, 1 fig, 7 ref.

Descriptors: *Waste water treatment, *Industrial waters, *Ion exchange, *Pulp and paper industry, Freshwater, Demineralization, Ions, Cations, Anions, Anion exchange, Cation exchange, Water purification, Desalination, Resins, Water properties, Electrical conductance, Electric insulation, Conductivity, Capacitors.
Identifiers: *Condenser paper, *Capacitor paper, Dielectric properties, Dielectrics.

Because of presence of electroconductive cations and anions in the process water would impair the dielectric properties of capacitor and condenser papers, they must be removed as much as possible from the water supply of paper mills, along with suspended and dissolved solids in general. The water-treatment installation of an insulating paper mill must be designed on the basis of available water characteristics. Most installations in condenser paper mills comprise two stages, viz., a conventional treatment and a deionization stage. The latter involves passing the process water through a series of columns filled with cation- and anion-exchange resins. The resins used must possess high chemical, thermal, and mechanical resistance. Some typical examples are tabulated, along with the respective achievable minimum specific water conductivities and other desirable characteristics of the treated waters. (Speckhard-IPC)
W74-02247

USE OF FIBROUS MATERIALS FOR REMOVAL OF IRON AND IRON COMPOUNDS FROM THERMOELECTRIC POWER PLANT WATER AND CONDENSATES, (IZPOLZUVANE NA VLAKNEST MATERIAL ZA ULAVYANE NA ZHELEZO I ZHELEZNI SUEDINENIYA OT VODITE I KONDENZATITE NA TETS),
Z. Litovski, G. Litovska, and P. Boevska.
Tseluloza i Khartiya, Vol 3, No 6, p 14-17, Nov./Dec., 1972. 3 tab, 5 fig, 6 ref.

Descriptors: *Waste water treatment, *Pulp wastes, Water purification, *Boiler feed water, *Filters, *Fibrous beds, Iron, *Iron compounds, Demineralization, Pulp and paper industry, Retention, *Industrial water, Filtration, Hydration, Colloids, Dissolved solids, Clogging, Water treatment, Pressure.
Identifiers: Pulps, Kraft pulps, Sulfite pulps, Groundwood pulps, Semichemical pulps, NSSC (Neutral sulfite semichemical) pulps, Bleached pulps, Beating degree, Freeness, Fibrillation, Condensates.

In the purification of boiler feed waters and condensates, ion-exchange resins will not retain colloid particles and are readily clogged. These difficulties can be overcome by using pulps and similar fibrous materials as iron-retaining filters. When such fiber mats, which must be 3-10 mm thick, become saturated, they need not be regenerated, but can be disposed of. The Fe-retaining capacity of several pulp types (groundwood, neutral sulfite semichemical, bleached softwood kraft, and bleached softwood sulfite pulps) was investigated and was found to vary with the nature of the fibers, the filtration pressure, and the pulp 'freeness' (a measure of drainage or filtration resistance). High filtration rates lowered the retention of total, soluble, and colloidal Fe, whereas high 'beating degrees' (fibrillation and hydration) increased the Fe retention. Among the pulps tested, bleached sulfite pulp showed the best retention, viz., 72.5, 69.3, and 75% of total, dissolved, and colloidal Fe, respectively. (Stapinski-IPC)
W74-02251

HYLTE BRUK: NEWSPRINT AND ENVIRONMENTAL PROTECTION, (HYLTE BRUK: ZEITUNGSDRUCKPAPIER AND UMWELTSCHULTZ).

Das Oesterreichische Papier, Vol 9, No 7, p 23, 25-27, July 1972. 1 tab, 1 illus.

Descriptors: *Pulp wastes, *Waste water treatment, Pollution abatement, Pulp and paper industry, Europe, *Industrial wastes, Filtration, Coagulation, Sedimentation, Biological treatment, Flocculation, Waste treatment, Treatment facilities, Chemical precipitation.
Identifiers: *Sweden, Newsprint, Paper machines, White water, Groundwood mills, Newsprint mills, Pulp mills, Paper mills, *Environmental protection, *Combined treatment.

Hylte Bruks AB. in Sweden originally manufactured sulfite pulp and paper since 1907, but was taken over in 1970 by an association of 4 Swedish and 1 German company and expanded and converted to the production of groundwood and newsprint, in addition to building boards, partly in order to reduce water and air pollution problems. The old sulfite mill switched, for similar reasons, from Ca to Mg base cooking liquor. In addition to noise control, the expanded facilities provide for improved waste water treatment in a modern clarifier installation which permits no toxic matter to be discharged into the Nissan River. The newspaper machine's white water is being treated in four stages involving filtration, chemical flocculation plus sedimentation, biological oxidation with activated sludge, and chemical precipitation. The combined installation reduced the effluent BOD from 34 to 6 tons/day, the discharge of suspended solids from 16 to 2 tons/day, and the discharge of lignin from 78 to 3 tons/day. Partly as a result of closing the still operating pulp bleachery, a further reduction of BOD to 4.5 tons/day is expected by 1975. Of the total capital invested in the expanded production, namely 255 million Swedish Crowns, ca. 10% was spent on environmental protection measures. (Speckhard-IP)
W74-02256

WASTE WATER RESEARCH FOR THE PULP AND PAPER INDUSTRY AT THE DARMSTADT TECHNOLOGICAL INSTITUTE (ABWASSERFORSCHUNG FUER DIE PAPIER-UND ZELLSTOFFINDUSTRIE AN DER TH DARMSTADT),
Technische Universitaet, Darmstadt (West Germany). Wasser- und Abwasserforschungsstelle.
W. Brecht.
Das Oesterreichische Papier, Vol 9, No 7, p 15-19, July 1972. 1 tab, 4 fig, 26 ref.

Descriptors: Foreign research, *Waste water treatment, *Pulp wastes, Water conservation, Research facilities, *Pulp and paper industry, Europe, *Industrial wastes, Effluents, Sludge disposal, *Sludge treatment, *Recycling, Pollution abatement, Water pollution sources, Water pollution treatment, Freshwater, Research and development, Research priorities, Dewatering, Pulp wastes, Bibliographies, Suspended solids.
Identifiers: *Germany, White water, Chemical recovery, Fiber recovery, Papermaking.

The Research Center for Water and Waste Water (WAF) of the Institute for Paper Manufacture at the Technological Institute in Darmstadt pursues research studies in the following areas: Biological, chemical, and physico-mechanical treatment of paper industry effluents; recycling of aqueous effluents for minimization of freshwater consumption in paper mills; recovery of fibers, fillers, and other papermaking additives from paper machine white water for improved process economy and waste water clarification; and dewatering and disposal of sedimented effluent sludges. A bibliography of technical reports published by WAF between 1957 and 1970 is appended. The ecological significance of these investigations is pointed out and discussed in historical perspective, and problems awaiting further developments are indicated. (Speckhard-IPC)
W74-02257

PURIFICATION OF EFFLUENTS BY MEANS OF REVERSE OSMOSIS, (OCHISTKA STOCHNYKH VOD METODOM OBRATNOGO OSMOSA),
Yu. I. Dytnerskii, R. G. Kocharov, G. V. Makarov, and V. A. Minaev.
Khimiya Promyshlennost', Vol 47, No 12, p 895-899, 1971. 5 tab, 2 fig, 43 ref.

Descriptors: *Reverse osmosis, Pollution abatement, *Waste water treatment, *Treatment facilities, *Economic feasibility, *Industrial wastes, Liquid wastes, Effluents, Efficiencies.

A general review is presented of the principles, effectiveness, economics, and equipment involved in the treatment of industrial aqueous effluents by reverse osmosis. (Chern-IPC)
W74-02258

SODIUM RECOVERY FROM A PULP MILL WASTE EFFLUENT BY ION EXCHANGE,
Himsley Engineering Ltd., Toronto (Ontario).
A. Himsley.
Ion Exchange and Membranes, Vol 1, No 1, p 51-56, 1972. 4 fig, 4 ref.

Descriptors: *Pulp wastes, Water pollution control, Pollution abatement, *Waste water treatment, Treatment facilities, *Ion exchange, Automatic control, *Sulfite liquors, *Sodium compounds, Pulp and paper industry, Water pollution sources, Canada, Effluents, Neutralization, Sulfuric acid, Sodium hydroxide, Alcohols.
Identifiers: Vanillin, Sulfite alcohol, Spent sulfite liquor, Ethanol (or Ethyl alcohol), *Chemical recovery, Sodium sulfite, Spent liquors.

The sulfite pulp mill of Ontario Paper Co. in Thorold, which uses sodium-base sulfite cooking liquor, produces also 95% ethyl alcohol (sulfite alcohol) and vanillin from its spent sulfite liquor. Maximum vanillin production requires excess caustic which, in turn, consumes 50 tons per day

of sulfuric acid for waste stream neutralization. In order to recover the large volume of sodium-base chemicals from the effluent, a complicated ion-exchange system utilizing the fixed-bed technique was developed and scaled up into a fully automated commercial installation, in which the need for specially trained operators was obviated by built-in logic circuitry and simple alarm systems. (Witt-IPC)
W74-02259

CHARACTERIZATION AND TREATMENT OF FISH PROCESSING PLANT EFFLUENTS IN CANADA,
Department of the Environment, Ottawa (Ontario).
K. Shikaze.
Technology Development Report EPS 4-WP-73-2, June 1973. 44 p, 24 tab, 8 fig, 19 ref.

Descriptors: *Industrial wastes, Fish handling facilities, *Pollution abatement, *Waste water treatment, Effluents, Economic feasibility, Fish types, Treatment facilities, *Food processing industry, *Canada.
Identifiers: Fish oil, Fish meal, *Fish processing wastes.

Five studies on fish-rendering wastes are summarized as technology background for the development of pollution-control guide lines in the fish-processing industry. They deal with the characteristics and treatability (by physical and biological methods) of effluents from the processing of redfish, sole, flounder, halibut, salmon, herring, shellfish, lobster, crab, and related freshwater and estuarial sources of fish meal, protein, and oil. Economic data (cost and profit figures) are included. (Brown-IPC)
W74-02262

EFFLUENT TREATMENT AT MAN-MADE FIBRE PRODUCTION UNITS,
Courtaulds Ltd., Coventry (England). Research Div.
T. R. Jones.
Effluent and Water Treatment Journal, Vol 12, p 352-355, 1972.

Descriptors: *Textiles, *Industrial wastes, *Waste water treatment, Water pollution control, *Pollution abatement, *Water pollution sources, Effluents, Waste treatment, Activated sludge, Biological treatment, Microorganisms, Bacteria, Color, Toxicity, Pollutants, Cellulose, Sulfates, Sulfur compounds, Sulfur bacteria, Zinc, Carbohydrates, Ion exchange, Sulfides, Dye releases, Dyes, Recycling, Monitoring.
Identifiers: *Synthetic fibers, Hemicelluloses, Cyanides, Viscose rayons, Viscose process, Zinc sulfate, Zinc compounds, Dissolving pulps, Carbon disulfide, Spinning, Washing, Chemical recovery, Plating, Carbon fibers, Sulfuric acid, Spent liquors.

Most textile fiber production technologies involve dry processes, such as the spinning of acetate, acrylic, polyamide, polyester, and glass fibers, thus causing no effluent problems. Others give rise to effluents that are conveniently treatable by biological methods, such as wet spinning and fiber washing wastes. Removal of cyanide is necessary with steel tire cords which require brass plating, and with carbonized fibers which emit hydrogen cyanide. The oldest and most important man-made fiber, viscose rayon, consumes large amounts of water and requires sodium hydroxide, carbon disulfide, zinc sulfate, and sulfuric acid as major chemicals in the mercerization, xanthation, ripening, cellulose regeneration, coagulation, and spinning stages. Process economy, and environmental protection call for optimum chemical recovery, as well as for effluent treatment to remove BOD-consuming hemicelluloses originating from the wood pulp (mostly spruce and eucalyptus). Zinc sulfate, which is toxic and most objectionable, can be removed from effluents by ion-exchanged resins and/or reaction with sodium hydroxide after preliminary neutralization with calcium hydroxide. Sulfide-bearing alkaline spent liquors are conventionally treated with Thiobacillus thiooxidans, using the activated sludge technique. Correct choice of fiber dyes and pigments permits closed-circuit operation and avoidance of colored effluents. Accidental spills must be prevented by careful storage of chemicals, installation of traps, and well-planned effluent monitoring and safe factory housekeeping practices. (Witt-IPC)
W74-02263

REMOVAL OF ORGANIC MATERIAL BY ADSORPTION ON ACTIVATED CARBON,
Chemviron S.A., Brussels (Belgium).
R. A. Davies, H. J. Kaempf, and M. M. Clemens.
Chemistry and Industry, No. 17, p 827-831, September 1,1973. 1 tab, 8 fig, 4 ref.

Descriptors: *Water treatment, *Waste water treatment, *Activated carbon, *Sewage treatment, Tertiary treatment, Treatment facilities, Industrial wastes, Pollution abatement, Color, Odor, Taste, Pollutants, Effluents, Operating costs, Costs, Potable water, Industrial water, Irrigation water, Toxicity, Incineration, Granules, Particle size, Adsorption, Water reuse.
Identifiers: *Lake Tahoe (Calif-Nev).

Activated carbon has found widespread use for prepurification of potable and industrial waters and treatment of municipal and industrial waste waters, not only for removal of color, taste, and odor, but also for prevention of pollution by pesticides and other biodegradable and nondegradable organics in general. The physical principles of adsorption on carbon particles and beds are reviewed, and some process engineering considerations are discussed, including costs of granular carbon reactivation, justification of combustion furnaces, and relative merits of powdery vs. granular carbons. The first full-scale application of granular carbon for tertiary treatment was at Lake Tahoe, where aeration tank effluent is passed through eight parallel adsorbers to reclaim daily 28,000 cu m of irrigation water. At Windhoek, South Africa, potable water is recovered from sewage in a plant processing 200 cu m/hr. Three typical industrial installations where granular carbon finds use in removal of toxic and colored effluent components include a Swiss explosive factory, a herbicide factory on the U.S. West Coast, and a carpet mill in Pennsylvania. (Brown-IPC)
W74-02264

REMOVAL OF ORGANIC MATTER FROM WATER BY RESINOUS ADSORBENTS,
Bayer A. G., Leverkusen (West Germany).
C. Oehme, and F. Martinola.
Chemistry and Industry, No 17, p 823-826, September 1, 1973. 3 tab, 4 fig, 2 ref.

Descriptors: *Waste water treatment, Water treatment, *Ion exchange, *Anion exchange, *Humic acids, Lignins, Pores, Porosity, *Resins, Fouling, *Detergents, Pollutants, Separation techniques, Industrial wastes, Liquid wastes, Adsorption, Dyes, Metals, Surfaces, Sulfonates, Water reuse, Recycling, Organic matter.
Identifiers: *Lignosulfonic acids.

Weakly basic anion exchangers having a surface area of 40-80 sq m/g and an average pore diameter of 300-500 Angstrom are especially suitable for demineralization of waters polluted by humic and lingnosulfonic acids and anionic detergents. Strongly basic macroporous organic scavengers can be used to remove humic acids from water and waste water, provided the resins are not fouled by anionic detergents. Special macroporous adsorber resins can remove nonionic detergents from rinse water of metal plating shops. Various types of resinous adsorbents should also be considered for treating and recycling waste waters of dye works. (Brown-IPC)
W74-02266

REDUCTION OF BOD AND PHOSPHATE BY CHEMICAL PRECIPITATION. UTILISATION OF SLUDGE,
Uhde (Friedrich) G.m.b.H., Dortmund (West Germany).
E. Hosenfeld, and W. Liebig.
Chemistry and Industry, No 12, p 565-567, June 16, 1973. 1 fig.

Descriptors: *Sludge treatment, Aluminum, *Phosphates, Sewage treatment, *Coagulation, Sulfates, Calcium, Metals, Deionization, Viruses, *Biochemical oxygen demand, Aquatic microorganisms, Fertilizers, Dewatering, Drying, Costs, Operating costs, Capital costs, Public health, Incineration, Europe, *Chemical precipitation, *Waste water treatment.
Identifiers: *Aluminum sulfate, Precipitants, Coagulants, Sweden.

Aluminum sulfate is an excellent precipitant which is used in over 90% of the 300 Swedish sewage-treatment installations. It removes not only phosphate detergents threatening eutrophication of lakes, but also BOD-consuming organic compounds, metallic and other ions, and pathogens, notably viruses. Precipitation can be performed in four modes, viz., direct, preliminary, simultaneous, or final precipitation. The latter gives the best results, i.e., 95% removals of BOD and phosphate. Although virus removals of 99.0-99.9% can be achieved, the clarified sludge must not be reused as fertilizer without pasteurization. Coprecipitation in the presence of calcium, i.e., under neutral conditions, will remove most metals in true solution around pH 7. Metering station with silo and dissolving equipment for granular aluminum sulfate (costing ca. 13 British pounds/ton in Sweden) may require a capital investment of 4,000 to 20,000 British pounds. Total capital plus operating costs for chemical precipitation are estimated at 0.005-0.01 German Marks per inhabitant per day. Effluent purification by final precipitation requires 10% more capital than biological treatment and ca. 25% higher total cost. Sludges can be treated in three different ways: (1) aerobic stablization and drying, (2) anaerobic stabilization in towers plus dewatering, and (3) mechanical dewatering and incineration. Precipitated sludge can find uses as soil fertilizer, bacterial culture medium, supplementary animal fodder (after proper treatment), and raw material for recovery of elementary phosphorus by a Danish patented thermocraking process. (Brown-IPC)
W74-02267

ION EXCHANGE AND ALLIED PROCESSES IN WATER RECOVERY,
Permutit Co. Ltd., London (England).
J. E. Goddard.
Chemistry and Industry, No 12, p 563-565, June 16, 1973. 2 fig, 2 ref.

Descriptors: *Waste water treatment, *Treatment facilities, *Economic efficiency, *Cost analysis, *Reverse osmosis, *Electrodialysis, Water treatment, Operating costs, Costs, Cost comparison, Capital costs, Electric power, Membrane processes, Membranes, Water reuse, Water quality, *Ion exchange.
Identifiers: Hollow fibers, Ion exchangers, Reverse osmosis modules.

The operating principles, applications, and capital and operating costs of ion exchange, electrodialysis, and reverse osmosis are compared. The cost of ion-exchange installations varies between 400 and 1000 British pounds per cu m/hr of water treated,

depending on number and size of resin beds required and on flow rate, feed concentration, resin combination, cycle time, operating pressure, construction materials, and degree of automation. Although power costs for electrodialysis can be estimated from Faraday's law, polarization effects tend to increase them in practice, as does the need for acid dosing to prevent scaling in dialysis cells. Various types of osmotic membrane systems are now available, the latest development being Du Pont's hollow-fiber polyamide module with outside-to-inside passage of water. Operating costs are divided between power demand and membrane amortization. Commercial systems operating at 28 or 42 kg/sq cm (400 to 600 psi) consume ca. 2.6 kw-hr/cu m of treated water; membranes guaranteed to last 3 yr come to 0.03 British pound/cu m of trated water. The choice among these three treatment processes depends on numerous variables and economic considerations, including the desired treated water quality. These factors are discussed in some detail. (Brown-IPC)
W74-02268

IN-PIPE WASTEWATER CLEANUP.

Chemical Engineering, Vol 80, No 22, p 32, 34, Oct. 1, 1973. 1 fig.

Descriptors: *Sewage treatment, *Waste water treatment, *Pressure conduits, *Activated sludge, *Oxygenation, Pipelines, Recycling, Water reuse, Irrigation water, Fermentation, Oxygen, Aeration, Biochemical oxygen demand, Monitoring, Engineering structures, Injection, Suspended solids, Filtration, Separation techniques, Liquid wastes, Chlorination, Flotation, Sludge, *California.
Identifiers: *Pressure pipe treatment.

Encouraging results, notably capital cost savings of nearly 40%, are reported for the Pressure Pipe Treatment (PPT) of sewage and industrial wastes developed and funded by the Irvine Ranch Water District, Irvine, California, after four years of laboratory and pilot studies. The patented system combined purification of waste waters via activated sludge fermentation with long-distance (about 6.5 miles) conveying of treated water to the reuse site. The PPT flow scheme involves an initial high-rate screening step to separate solids which are then ground and sent to an aerobic sludge activator, in which the detention time for maximum activation (3-4 days) is shorter than for complete digestion. Activated sludge is then combined with the liquid portion of the sewage inside the pipeline, with facilities for en-route injection of air or oxygen and on-line BOD monitoring. For forest irrigation and similar applications, the pipeline effluent can be used directly; otherwise, an air flotation separator will remove sludge, some of which is recycled as seed material through existing regional waste-collection sewers, and the balance is used for soil conditioning. The sludge-free water is treated in a sand filter for further removal of suspended solids and BOD reduction. Some reclaimed water may be chlorinated or subjected to other final processing, such as nitrogen removal, before reuse. The main advantage of PPT is its nearly 100% utilization of the oxygen supplied, in contrast to the 6% efficiency of conventional secondary treatments. Popeline flow rates of 0.5 to 6.0 ft/sec are envisioned, along with pipe residence times as short as 1 hr. (Brown-IPC)
W74-02269

DRY ACTIVATED SLUDGE AS FERTILIZER FOR WINTER WHEAT AND CORN, (SUKHOI AKTIVNYI IL KAK UDOBRENIE DLYA POSEVOV OZIMI PSHENITS' I KUKURUZ'),
L. G. Tsvetkova, and L. S. Miroshnichenko.
Gidroliznaya i Lesokhimicheskaya Promyshlennost', Vol 25, No 3, p 18-20, 1972. 6 tab.

Descriptors: *Activated sludge, *Sludge disposal, *Soil disposal fields, *Fertilizers, Nitrogen compounds, Phosphorus compounds, Farm management, Agricultural chemicals, Chlorophyll, *Corn (Field), Cereal crops, *Wheat, Field crops, Effluents, Waste water treatment, Hydrolysis, Yeasts, Industrial wastes, Proteins, Waste disposal, Chemical industry.
Identifiers: Carotene, Wood hydrolysis, Hydrolyzates, Hydrolysis industry.

Agricultural farm plots were treated, prior to the sowing of winter wheat and corn, with 40 kg/ha of a nitrogen-phosphorus mineral fertilizer in comparison with 1 ton/ha of dried activated sludge obtained from the effluent-treatment plant of the Zaporozhe hydrolysis and yeast factory in the USSR. Both types of fertilizer produced similar increases in leaf chlorophyll and carotene and in grain protein contents over unfertilized control plots, but the activated sludge induced higher crop yields compared to the conventional fertilizer. (Stapinski-IPC)
W74-02270

EXPERIENCE WITH THE OPERATION OF PURIFICATION EQUIPMENT, (OPYT EKSPLUATATSII OCHISTNYKH SOORUZHENII),
Tavdinskii Gidroliznyi Zavod (USSR).
P. G. Pavlos, A. E. Norina, L. V. Korenyuk, and F. G. Kardash.
Gidroliznaya i Lesokhimicheskaya Promyshlennost', Vol 25, No 6, p 21-23, 1972. 2 tab.

Descriptors: *Waste water treatment, *Industrial wastes, *Water pollution sources, *Treatment facilities, Chemical industry, Wood wastes, Hydrolysis, Yeasts, Sedimentation, Filtration, Aeration, Fermentation, Waste treatment, Biochemical oxygen demand, Chemical oxygen demand, Carbohydrates, Mixing, Effluents, Water pollution, Pollutants.
Identifiers: Hydrolysis industry, Hydrolyzates, Mixers, Wood hydrolysis, Furfural, *USSR (Tavda).

In 1970, the Tavda hydrolysis factory (USSR) installed an effluent treatment system simultaneously with the startup of a yeast production facility for the processing of wood hydrolyzates. Effluents from the fermentation and yeast-cultivation operations are passed through sand filters and primary sedimentation tanks, then purified with aerated biological filters and subjected to a secondary sedimentation. The process removes about 60% of the five-day BOD and 80% of the COD (in terms of permanganate-oxidizable matter). Because neither the purification degree nor the capacity of the treatment facilities is sufficient to avoid discharging considerable portions of the effluent into the river without purification, additional equipment installations are being planned, along with process modifications. Residual fermentation liquor will be reused to prepare nutrient salts and to dilute the nutrient medium. A milder hydrolysis process is contemplated to reduce the undesirable degradation of fermentable sugars. A mixer is to be installed to accelerate the decomposition of furfural (which interferes with the yeast fermentation). (Stapinski-IPC)
W74-02272

(TAPPI) ENVIRONMENTAL CONFERENCE, MAY 14-16, 1973.
Technical Association of the Pulp and Paper Industry, Atlanta, Ga.

Conference held in San Francisco, Calif., May 14-16, 1973. Preprinted Proceedings, TAPPI, Atlanta, Ga., 263 p.

Descriptors: *Conferences, *Pulp and paper industry, *Pollution abatement, *Environmental control, Environmental effects, Pulp wastes, Bleaching wastes, Sludge treatment, Sludge disposal, *Industrial wastes, *Waste water treatment, Recycling, Water reuse.

This volume of conference preprints contains the unreferred texts of 23 presentations by different authors. They deal largely with the treatment of pulp and paper mill effluents, the recovery of spent pulping liquors, water reuse and conservation, sludge handling and disposal, and related topics of ecological importance to the paper industry. (See W74-02274 thru W74-02286) (Brown-IPC)
W74-02273

THE CPAR PROGRAM - GOVERNMENT-INDUSTRY COOPERATION IN POLLUTION ABATEMENT RESEARCH,
Department of the Environment, Ottawa (Ontario).
J. E. Stone, and R. J. Neale.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings, TAPPI, Atlanta, Ga., p 5-8.

Descriptors: *Canada, *Research and development, *Governments, *Pollution abatement, *Pulp and paper industry, Grants, Contracts, Financing, *Waste water treatment, Water quality control, Air pollution, Industrial wastes, Pollutant identification, Toxicity, Analytical techniques, Aquatic life, Sulfite liquors, Color, Biochemical oxygen demand, Bioassay, Measurement, Coordination, Management.

The Cooperative Pollution Abatement Program (CPAR) of the Canadian government is designed to fund research projects between mid-1970 and March 1976 aimed at the development of better and cheaper methods of controlling water and air pollution in the pulp and paper industry. The joint government-industry nature of the program, its operation, and some typical projects thus far supported are outlined. In the water pollution abatement sector, the coordinating committee recognizes 7 general areas of research needs: (1) reduction of toxicity of effluents to aquatic flora and fauna, (2) reduction of effluent BOD, (3) recovery of spent sulfite liquors, (4) removal of suspended solids, (5) determination of cause-and-effect relationships between pollutants and the environment, (6) reduction of effluent color, and (7) development of measurement methods, notably rapid estimation of 5-day BOD and toxicity prediction from other than bioassay techniques. (See also W74-02273) (Brown-IPC)
W74-02274

WATER QUALITY CONTROL PROGRAM AT PUBLISHERS PAPER CO.,
Publishers Paper Co., Oregon City, Oreg.
C. Mayer, Z. Rozyski, and A. L. Caron.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings, TAPPI, Atlanta, Ga., p 9-14, 6 tab, 4 ref.

Descriptors: *Pulp wastes, *Treatment facilities, *Waste water treatment, *Pollution abatement, *Oregon, Pulp and paper industry, Sulfite liquors, Magnesium hydroxide, Magnesium compounds, Incineration, Filtration, Sludge treatment, Sludge disposal, Suspended solids, Aerated lagoons, Aeration, Biochemical oxygen demand, Operating costs, Capital costs, Costs, Economic efficiency, Filters, Waste treatment, Industrial wastes.
Identifiers: Willamette River (Ore), Sulfite mills, Groundwood mills, Newsprint mills, Clarifiers, White water, Integrated pulp and paper mills.

Publishers Paper Co. operates two integrated pulp and paper mills in Oregon City and Newberg, Oregon, which produce refiner groundwood, Mg-base sulfite pulp, newsprint, and tissue papers. Over a five-year period, the company invested $19.5 million in chemical recovery and effluent treatment installations, partly for pollution protection of the Williamette River. Aside from the initial conversion of the sulfite pulping and spent liquor recovery system to a soluble-base cooking liquor, these facilities included white water clarifiers, sludge-dewatering filters, and smokeless incinera-

tors to accomplish ca. 90% removal of suspended solids, as well as aerated stabilization basins to achieve BOD reductions of ca. 98%. Operating costs are calculated at ca. $11 per ton of solids removed and $0.02 per pound of BOD removed. (Brown-IPC)
W74-02275

MEASURING STRESS IN FISH EXPOSED TO PULP MILL EFFLUENTS,
British Colombia Research Council, Vancouver.
For primary bibliographic entry see Field 05C.
W74-02276

LABORATORY AND CONTROLLED EXPERIMENTAL STREAM STUDIES OF THE EFFECTS OF KRAFT EFFLUENTS ON GROWTH AND PRODUCTION OF SALMONID FISH,
Oregon State Univ., Corvallis.
For primary bibliographic entry see Field 05C.
W74-02277

PULP AND PAPER MILL SLUDGE UTILIZATION AND DISPOSAL,
Crown Zellerbach Corp., Camas, Wash. Environmental Services Div.
T. R. Aspitarte, A. S. Rosenfeld, B. C. Smale, and H. R. Amberg.
In: TAPPI Environmental Conference, San Francisco, Calif., May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 27-49, 18 tab, 4 fig.

Descriptors: *Sludge disposal, *Sludge treatment, *Pulp wastes, *Economic, Costs, Incineration, Byproducts, Fertilizers, Mulching, Soil amendments, Agronomic crops, Crop production, Dewatering, Drying, Marketing, Water reuse, Recycling, Waste water treatment.
Identifiers: Materials handling, Baling.

Four methods for reuse of fibrous sludge from primary effluent-treatment plants of pulp and paper mills are described and evaluated. They include (1) incineration in an entrained- air dryer-furnace, (2) combustion in hogged-fuel boilers, (3) agricultural soil conditioning, and (4) hydromulching for soil stabilization. Sludge properties varied considerably, but could be characterized with frequent sampling by determinations of Canadian Standard Freeness, ash content, and fiber size distribution. The variability of composition limits the use of sludge for by-products. Sludge sales are also restricted to bulk material of 30-40% consistency, requiring adequate handling facilities at loading-unloading sites. Baling after semidrying incurs further cost. The air-entrained incinerator involved high maintenance costs, owing to high temperature, high gas velocity, and high solids flow, but did meet air quality standards with proper operation. Sludge disposal by incineration cost ca. $13/dry ton, compared to $11.50 for combustion in hog-fuel boilers. In test farm plots, high sludge levels left to decompose for 1 year before crop planting resulted in significantly increased yields for two successive bean and corn harvests. However, addition of equivalent amounts of fresh sludge to yearly amended plots gave reduced crop yields, owing to nitrogen deficiency. Beans matured faster in plots amended with 400 and 600 tons of sludge per acre than in control plots. On a simulated highway cut, hydromulched sludge with or without bark dust proved to be competitive with a commercial product in establishing a grass stand. (See also W74-02273) (Brown-IPC)
W74-02278

ADVANCED PRACTICAL WATER RECYCLE IN TISSUE MANUFACTURE,
Kimberly-Clark Corp., Neenah, Wis.
A. R. LeCompte.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 50-65, 4 fig, 1 ref.

Descriptors: *Pulp wastes, *Waste water treatment, *Water reuse, Pulp and paper industry, *Industrial wastes, Effluents, Pollution abatement, *Recycling, Filtration, Sedimentation, Aeration, Calcium compounds, Magnesium compounds, Carbon dioxide, Lime, Calcium carbonate, Magnesium carbonates, Carbonates, Bicarbonates, Polyelectrolytes, Biochemical oxygen demand, Chemical oxygen demand, Suspended solids, Water quality control, *Canada, Industrial water.
Identifiers: Tissue papers, Paper machines, White water, Big East River, Canada, Ontario (Canada).

Built in a resort area, the Huntsville (Ontario) tissue mill of Kimberly-Clark of Canada Ltd. controls pollution of the Big East River by a water reclamation system which recycles about 87% of the process water to a high-speed tissue paper machine at rates of up to 2.5 million gal/day, while reducing the effluent to ca. 0.19 million gal/day. The multistage water and effluent treatment involves essentially retention in a polishing basin, aeration, and filtration through twin one-acre percolation beds. Chemicals used for removal of color, suspended solids, and corrosive components include Mg and Ca bicarbonates, carbon dioxide, unslaked reactive Ca oxide, precipitated Ca carbonate, and two unspecified polyelectrolytes. The treated effluent contains no color bodies, only 2.5 lb/day of nonfilterable residue, 1.8 to 6.0 lb of 5-day BOD loading, and 36 lb/day of COD. Its discharge increases the river's solids content from 45 to 480 mg/liter, but the effects of this on other stream qualities are said to be undetectable by conventional test methods. (See also W74-02273) (Brown-IPC)
W74-02279

ADVANCED TREATMENT OF PURIFIED SEWAGE FOR PRODUCTION OF HIGH--BRIGHTNESS PULP AND PAPER,
South African Pulp and Paper Industries Ltd., Springs. Enstra Mill.
H. J. Jacobs, and L. Smith.
In: TAPPA Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 51-58, 5 tab, 7 ref.

Descriptors: *Water reuse, *Sewage treatment, *Industrial water, Water supply, *Pulp and paper industry, Africa, Biological treatment, *Tertiary treatment, Flotation, Water purification, Freshwater, Water resources development, Coagulation, Corrosion, *Waste water treatment.
Identifiers: *South Africa, Aluminum sulfate, Polyfloc 84 D, Corrosion inhibitors, Vaal River (South Africa).

The Enstra mill of SAPPI has a daily production of ca. 190 tons bleached kraft pulp, 135 tons semibleached kraft pulp, 140 tons fine paper, and 200 tons newsprint. Of the mill's daily water supply, only 4.2 million U.S. gal is freshwater, pumped from the Vaal River 60 miles away. The greater proportion (6.6 million gal) derives from biologically purified and tertiary-treated sewage refined by a flotation process, using alum in conjunction with a polyelectrolyte (Davco Polyfloc 84A) to reduce alum dosage, plus NaOH to reduce water corrosivity. The development of this water treatment process is sketched from laboratory through pilot-plant studies to full-scale operation. The papermaking suitability of the sewage-derived process water is evaluated by means of a specially developed handsheet brightness test. (See also W74-02273) (Brown-IPC)
W74-02280

TREATMENT OF SULFITE EVAPORATOR CONDENSATES FOR RECOVERY OF VOLATILE COMPONENTS,
Institute of Paper Chemistry, Appleton, Wis.
I. W. Baierl, B. F. Lueck, and A. J. Wiley.
In: TAPPI Environmental Conference, San Francisco, Calif., May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 73-87, 1 tab, 11 fig.

Descriptors: *Pulp wastes, *Water reuse, Water purification, *Waste water treatment, *Activated carbon, *Byproducts, Pulp and paper industry, Biochemical oxygen demand, Chemical oxygen demand, Alcohols, Organic compounds, Sulfur compounds, Sulfite liquors, Water pollution treatment, Water pollution sources, *Recycling.
Identifiers: Methanol, Ethanol, Furfural, Sulfur dioxide, Sulfite pulp mills, Evaporator condensates, Condensates.

Cooperative research studies on the removal of pollutants from sulfite pulp mill evaporator condensates have been conducted for five years in two separate projects supported by the Environmental Protection Agency, the Wisconsin Dept. of Natural Resources, and ten pulp and paper companies. They are based partly on preliminary work done at Scott Paper Co. and the Lowell Technological Institute. A pilot plant for the Scott system, installed at the Appleton Division (Wisconsin) of Consolidated Papers Inc., involves steam stripping, adsorption on activated carbon, and fractional distillation. Operating experience showed that relatively pure sulfur dioxide, methanol, furfural, and acetic acid can be recovered, with excellent simultaneous reduction of condensate COD and BOD and with production of water sufficiently pure to be reused in the mill. The second system, based on a low-temperature (20 C) thermally regenerated activated carbon adsorption column, is being operated in the IPC laboratories, using a Lowell-designed unit in which the carbon can be reused through 31 or more cycles. Some process operating data and experiences for both systems are reported. (See also W74-02273) (Brown-IPC)
W74-02281

PROCESS WATER REUSE AND UPSET CONTROL MODIFICATIONS AT AN INTEGRATED NSSC MILL,
Green Bay Packaging Inc., Wis.
W. R. Nelson, G. O. Walraven, and D. C. Morris.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 219-227, 2 tab, 9 fig.

Descriptors: *Waste water treatment, *Pulp wastes, *Pollution abatement, *Treatment facilities, *Water reuse, Pulp and paper industry, Industrial water, Water purification, Effluents, Incineration, Evaporation, Water pollution treatment, *Wisconsin, Monitoring, Dissolved solids, Biochemical oxygen demand, Costs, Cost-benefit analysis, Reverse osmosis, Sewers, Rivers.
Identifiers: Corrugating medium, NSSC pulping, Fox River (Wis).

At Green Bay, Wis., Green Bay Packaging Inc. operates an integrated sodium-base NSSC (neutral sulfite semichemical) pulp and paperboard mill on the Fox River, manufacturing 295 tons/day of corrugating medium on a high-speed fourdrinier machine. Process water for the mill is taken from the river, but not pretreated, except for steam boiler makeup softening. The daily production of 200 tons of NSSC pulp from hardwoods gives rise to 200,000 lb/day of dissolved solids, of which 75% are removed in the combined screw pressate and digester blow liquors. collected wastes are evaporated indirectly to 21% solids content and passed to the concentrated spent liquor system before incineration in a fluid-bed Dorr-Oliver reactor. A pollution-control system encompassing extensive white water reuse has been installed, in which reverse osmosis plays a significant part. The arrangement of sewers, recycled water flows, spill surge flow, and internal monitoring system is described and flowcharted. Technical data are given on discharged effluent characteristics (BOD, conductivity, soluble and suspended solids) and on costs and benefits of the installation. (See also W74-02273) (Brown-IPC)
W74-02283

COLOR REMOVAL FROM KRAFT PULP MILL EFFLUENTS BY MASSIVE LIME TREATMENT,
International Paper Co., Mobile Ala.
R. S. Wright.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 229-235, 1 tab, 3 fig.

Descriptors: *Treatment facilities, *Pulp wastes, *Bleaching wastes, *Color, *Lime, *Waste water treatment, Effluents, Costs, Sludge, Foaming, Chlorine, Efficiencies, Operating costs, Pulp and paper industry.
Identifiers: Kraft mills, Lime kilns, Wash waters, Kraft pulp, Alkaline extraction, Chemical recovery, Materials balance (or Mass balance), White liquor.

Massive treatment with lime according to the process developed by NCASI (National Council of the Pulp and Paper Industry for Air and Stream Improvement, Inc.) will remove over 90% of the color bodies from effluents of the final unbleached kraft pulp washing and of the alkaline extraction stage in bleach plants. These two effluents contain 65-75% of the total color load produced in the manufacture of bleached kraft pulp. Using all the lime normally available in a typical bleached kraft mill, about 14% of the total effluent can be treated. By treating the most highly colored effluents, 72% of the mill's total color load can be removed. The introduction of massive lime into the mill's liquor causticizing operation will dilute the white liquor and lower its concentration by about 15%. Hence the total liquor volume to be handled throughout a mill will increase and require chemical recovery and liquor preparation equipment of greater capacity. For a given pulp production, the fuel requirements of lime will increase by about 6.4%. Moreover, the carryover of organic compounds by the massive lime sludge into the cooking liquor system can intensify foam problems. Buildups of Cl and other materials have no apparent effect on the chemical recovery cycle. A typical 1000 ton/day kraft mill may spend ca. $1.80 per ton of bleached pulp for massive lime treatment of 4 million gal effluent without adverse effect on pulp bleachability or final product quality. (See also W74-02273) (Brown-IPC)
W74-02284

HYPERFILTRATION (REVERSE OSMOSIS) OF KRAFT PULP MILL AND BLEACH PLANT WASTES,
Oak Ridge National Lab., Tenn.
J. S. Johnson, Jr., R. E. Minturn, and G. E. Moore.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 237-243, 1 tab, 24 ref.

Descriptors: *Reverse osmosis, *Membranes, *Pulp wastes, *Bleaching wastes, Pressure, *Waste water treatment, Industrial wastes, Pulp and paper industry, Filtration, Temperature, Operation and maintenance, Membrane processes, Polymers.
Identifiers: Hyperfiltration, Cellulose acetate, Zirconium oxide, Wash waters, Salt rejection, Polyacrylates (or Acrylic resins), Process variables.

Various kraft mill effluents, including brown stock wash water, decker and screen room wastes, and bleach plant effluents, were subjected to high-pressure hyperfiltration through dynamic membranes of polyacrylate on a hydrous Zr (IV) oxide substrate; to moderate-pressure ultrafiltration using low-salt-rejection membranes comprising single layers of hydrous Zr (IV) oxide or of neutral organic polymers; and to low-pressure filtration. Dewatering of dilute black liquor was also attempted. Compared to conventional detachable cellulose acetate membranes, fluxes were considerably higher, and decontamination seemed adequate for reuse of many filtrates. Moreover, filtration could be conducted at the process temperature, and the membranes could be regenerated or removed and reformed in situ. (See also W74-02273) (Brown-IPC)
W74-02285

IMPROVING REVERSE OSMOSIS PERFORMANCE WITH DYNAMICALLY FORMED WOOD CHEMICAL MEMBRANES,
Institute of Paper Chemistry, Appleton, Wis.
I. K. Bansal, and A. J. Wiley.
In: TAPPI Environmental Conference, San Francisco, Calif., May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 245-256, 7 tab, 4 fig, 5 ref.

Descriptors: *Reverse osmosis, *Membranes, *Lignins, Water purification, *Desalination processes, Membrane processes, Desalination, *Pulp wastes, Byproducts, *Waste water treatment, Operation and Maintenance.
Identifiers: Salt rejection, Lignosulfonates, Wash waters, Process variables, Cellulose acetate, Zirconium oxide.

A systematic study is reported of factors affecting the design and performance of dynamically formed reverse osmosis (R.O.) membranes comprising high-molecular-weight lignin layers (obtained from dilute pulping effluents) as secondary active surfaces on cellulose acetate substrates. These membranes have salt rejection properties significantly better than those of conventional cellulose acetate membranes, at only a small sacrifice in flux rate. They are readily removable by washing and rapidly renewable within ca. 1 hr. Commercial R.O. modules, in which the acetate membranes had suffered hydrolytic and other degradation during 1-4 years of intermittent operation, could be successfully reactivated by superposition of dynamic lignin membranes. Among four different ligniferous preparations, crude fractions of chemimechanical pulp wash water were found to give membranes of superior salt rejection (NaCl, ammonium and calcium lignosulfonates) although dynamic membranes from ultrafiltered high-molecular lignin fractions were generally better in other respects. Important parameters affecting the membranes include their formation speed and pressure, the pH of the ligniferous solution, and the reverse osmosis feed velocity. Comparative performance data are presented for lignin-based vs. polyelectrolytic membranes made of hydrous Zr (IV) oxide. Although dynamic membranes are short-lived (3-4 days), they are rather inexpensive to prepare. (See also W74-02273) (Brown-IPC)
W74-02286

COMPUTER SIMULATION OF STORM WATER RUNOFF,
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 02E.
W74-02310

THE EFFECTS ON RUNOFF, GROUNDWATER, AND LAND OF IRRIGATING WITH CATTLE MANURE SLURRIES,
Tennessee Univ., Knoxville. Dept. of Agricultural Engineering.
J. I. Sewell, and J. C. Barker.
Available from the National Technical Information Service as PB-226 070, $3.50 in paper copy, $1.45 in microfiche. Research Report No. 31, Tennessee Water Resources Research Center, Knoxville, October 4, 1973. 26 p, 7 fig, 4 tab, 3 ref. OWRR A-021-TENN (3).

Descriptors: *Farm wastes, *Cattle, *Water reuse, Waste disposal, Slurries, *Waste management, *Organic wastes, Irrigation, Water quality, Groundwater, Surface runoff, Nitrates, Bacteria, Southeast U.S., *Tennessee, Humid climates, Path of pollutants.

The manure slurry irrigation system receiving lot runoff has performed satisfactorily and has been durable. Careful management is required to maintain storage capacity for lot runoff while controlling surface runoff or irrigated slurry. Dilution water must sometimes be added to the storage tank to facilitate solids removal. Dry-matter contents of slurry up to about 4 percent did not appreciably reduce system discharge rates. Manure slurry apparently infiltrated into the shallow groundwater on the downslope side of the test area. Surface runoff from the manure-saturated area on occasions contained both total and fecal coliform median concentrations exceeding the maximum standard for raw surface water for public supplies. All median surface runoff nitrate nitrogen concentrations were within the permissible criteria. An average application rate of 5.55 tons of dry matter per acre per month applied in the form of dairy manure slurry presented no problems of solids accumulation on the ground surface. Field irrigation with the manure slurry resulted in a 98% reduction in the total solids content of surface runoff and groundwater compared with that of the slurry.
W74-02326

FOURTH ANNUAL REPORT, CITY OF CARBONDALE, ILLINOIS, WATER AND WASTEWATER TREATMENT.
Carbondale Dept. of Public Works, Ill.

1971. 91 P, 21 FIG, 19 TAB.

Descriptors: *Documentation, *Water treatment, *Water works, *Sewage treatment, *Sewage disposal, Costs, Operation and maintenance, Water supply, *Waste water treatment, Illinois, Municipal wastes, Annual costs.
Identifiers: *Carbondale (Illinois).

The operation data for water and wastewater treatment plants in Carbondale, Illinois are presented. Included are data on the city's water treatment plant and its three wastewater treatment plants. Data included for the water treatment plant are: (1) personnel, (2) a flow chart of operation, (3) description of treatment processes, (4) history of plant expansion and facilities, (5) hydraulic flow data, (6) peak raw water flows, (7) chemicals used--by weight and cost, (8) laboratory data, and (9) flow and miscellaneous cost data. Information provided for the wastewater treatment plants include: (1) personnel, (2) a flow chart of operation, (3) hydraulic flow data, (4) raw influent data, (5) final effluent data, (6) plant efficiency data, (7) secondary plant data, (8) miscellaneous operating and cost data, (9) sludge disposal data, and (10) general cost data. The City obtains its water from both a nearby reservoir and a lake. Plant capacity is 8.0 mgd, and a total of 1.38 billion gallons of potable water was sold in 1971 at a operation and maintenance cost of 15 cents per 1000 gallons. Secondary sewage treatment is provided at a operation and maintenance cost of 24 cents per 1000 gallons and 1.1 billion gallons were treated in 1971. Effluent is discharged to a nearby creek. (Poertner)
W74-02328

SURVEY OF METHODS OF TREATING WINE AND GRAPE WASTE WATER,
New York State Dept. of Environmental Conservation, Albany. Environmental Quality Research and Development Unit.
T. J. Tofflemire.
Technical Paper No. 25, February 1973. 24 p, 8 tab, 38 ref.

Descriptors: *Waste water treatment, *Reviews, *Industrial wastes, *Fruit crops, Organic wastes, Waste treatment, New York, Biological treatment, Anaerobic digestion, Activated sludge, Trickling filters, Sewage lagoons.
Identifiers: *Winery wastes, *Grape waste water.

Waste characteristics and methods of treatment of wine and grape wastewaters were examined. These wastes have a high BOD, are seasonally variant and have a tendency to become acidic and odorous upon standing. Methods of possible treatment include: (1) activated sludge, (2) aerated lagoons, (3) trickling filters, (4) rotating biological disks, (5) irrigation systems, (6) anaerobic processes, and (7) chemical processes. Five principal winery wastes are described as: (1) pomace, which consists of dewatered grape skins, seeds and pulp, (2) lees, which are bottom sediment that accumulate during wine storage, (3) stillage bottle washings, the residue that remains after alcohol has been distilled from the fermented wine, lees or pomace, (4) cooling water wastes, and (5) salt waters from ion-exhange processes. Other wastes include various sugars, organic acids, proteins, trace metals, alcohol and other miscellaneous substances. A major difficulty in the use of biological methods of treatment is the high ratio of BOD to both nitrogen and phosphorus. Pretreatment is a usual practice to remove solids by cycloning, screening, sedimentation, or filtration. Treatment with other wastes by conventional methods is possible if close operational control is practiced. Lagoons and irrigation are more commonly used, and these methods can be simple, dependable and offer high quality treatment. Rotating disks are a new method which appears to be efficient and easy to operate. (Poertner)
W74-02329

CITY OF AUSTIN, TEXAS, STUDY OF WASTEWATER COLLECTION SYSTEM: PHASE I.
Horner and Shifrin, Inc., St. Louis, Mo.

Prepared for City of Austin, Texas, October 1, 1969. 139 p, 13 fig, 13 tab.

Descriptors: *City planning, *Sewerage, *Comprehensive planning, *Urbanization, *Sewers, Future planning (Projected), Cost-benefit analysis, *Texas, Economics, Combined sewers, Sewers, Separated sewers, Water pollution control, Long-term planning, Urban planning.
Identifiers: *Austin (Texas).

Expected future growth of the City of Austin, Texas requires that a plan be developed to provide adequate sewers. Two major alternatives were studied in this first phase of an overall study. One plan involves the construction of a parallel system of relief sewers, while the other plan relies on a deep tunnel transversing the city with supplemental sewers. The second plan was recommended because it was estimated to be the most economical alternative. It was estimated that the equivalent annual cost of the deep tunnel plan would be about $300,000 cheaper than the first plan in 1985, $427,000 cheaper in 1990, and $477,000 cheaper in 1995. The crosstown tunnel would also be less of an inconvenience to property owners and traffic, although the feasibility of the deep tunnel must be checked by soil tests. In developing the two plans, the planned future development of the City was taken into account. Based on the master plan for land use and expected populations along with water consumption rates for the various types of use, the size and placement of sewers was computed. An important factor in the plan was the extent of future growth. It was predicted that by 2020 the city would reach its ultimate development and that the system would need to be adequate for the expected state of development at that time. No further increase in system capacity was considered necessary after the year 2020. (Poertner)
W74-02330

METROPOLITAN WATER AND SEWER PLAN, LUBBOCK METROPOLITAN COUNCIL OF GOVERNMENTS.
Hudgins, Thompson, Ball and Associates, Inc., Lubbock, Tex.
For primary bibliographic entry see Field 03D.
W74-02331

A WATER AND SEWER PLAN: GREENE COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.

Prepared for Northeast Georgia Area Planning and Development Commission, Athens, December 1968. 151 p, 23 fig, 16 tab, 3 append.

Descriptors: *Comprehensive planning, *Water supply, *Sewerage, *Regional development, Sewers, Water supply development, Data collections, Financing, *Georgia, Optimum development plans, Financial feasibility, Forecasting, *Rural area.
Identifiers: *Green County (Geo).

A water and sewer plan for Greene County was prepared as part of a comprehensive water and sewer plan for the Northeast Georgia Area Planning and Development Commission. Financed by a grant of the Farmers Home Administration of the USDA, this report is concerned with rural areas and communities with a population of less than 5,500. Four communities of more than 300 and less than 5,500 exist in this county which had a total 1966 population of 11,300. Predictions for 1990 population range from a high of 16,140 to a low of 3,505. With the higher figure favored. Green County is located about 75 miles east of Atlanta. It has about 48 inches of rainfall annually. Temperatures range from an average of 46F in winter to 80F in summer with an annual average of 63 degrees. Two major rivers and several smaller rivers and creeks exist in the County. Public water supply systems serve only three communities, with water derived from both surface and ground water sources. Due to the low population densities in the County, it is recommended that a county-wide system not be developed but, instead, that individual communities develop systems if desired. County ownership of all water systems may be practical to reduce operating costs and provide easier financing and expansion. Sewerage systems exist in only two communities. In one other community it might be economically feasible to establish a system. (Poertner)
W74-02334

A WATER AND SEWER PLAN: MORGAN COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.

Prepared for Northeast Georgia Area Planning and Development Commission, Athens, April 1969. 115 p, 16 fig, 13 tab, 3 append.

Descriptors: *Comprehensive planning, *Water supply, *Sewerage, *Regional development, Sewers, Water supply development, Data collections, Financing, *Georgia, Optimum development plans, Financial feasibility, Forecasting, *Rural areas.
Identifiers: *Morgan County (Geo).

A water and sewer plan for Morgan County was developed as part of a comprehensive water and sewer plan for the Northeast Georgia Area Planning and Development Commission. Financed by the Farmers Home Administration of the USDA, this study is concerned with communities less than 5,500 in population and rural areas. With a total county population of about 10,000 in 1960 (down from 20,000 in 1920), only two communities of population less than 5,500 and greater than 300 exist in the county. Total county population in 1990 is predicted at about 3,000, with the City of Madison having about 4,000 and the City of Rutledge, the next largest city, about 280. Located about 60 miles east of Atlanta, the area receives about 47 inches of rainfall annually and has a temperature range from an average of 46F in winter to about 80F in summer. Surface water supply includes several rivers and streams and is abundant. Domestic water is primarily from wells. The major water system serves the City of Madison, where 500,000 gpd are pumped from a creek. System capacity is not adequate and major improvements have been suggested to provide more water to existing users and to extend water service. Three other communities also have public water supplies which should be adequate until about 1985 or 1990. No recommendations for providing water supply to rural areas were made. Sewerage systems exist in two communities; one is adequate until 1990 and the other is presently inadequate. Upgrading of the latter is suggested and outlined. In other areas of the County, sewerage systems should not be needed until 1990. (Poertner)
W74-02335

A WATER AND SEWER PLAN: MADISON COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.

Prepared for Northeast Georgia Area Planning and Development Commission, Athens, February 1969. 146 p, 23 fig, 14 tab, 3 append.

Descriptors: *Comprehensive planning, *Water supply, *Sewerage, *Regional development, Sewers, Water supply development, Data collections, Financing, *Georgia, Optimum development plans, Financial feasibility, Forecasting, *Rural areas.
Identifiers: *Madison County (Geo).

A water and sewer plan for Madison County was prepared as part of a comprehensive water and sewer plan for the Northeast Georgia Area Planning and Development Commission region. Financed by the Farmers Home Administration of the USDA, the primary purpose was to develop recommendations for water sewer service to rural areas and incorporated communities having a population of less than 5,500. Madison County is located about 70 miles northeast of Atlanta. It covers about 180,000 acres and receives about 48 inches of rainfall a year. The average temperature is about 62F, varying from 44F in winter to 79F in summer. The 1966 County population was about 12,000 which is expected to increase to about 14,000 by 1990. Other population estimates indicate a possible decline to about 4,300 persons by 1990. Only very limited public water supply systems exist in seven communities having a combined 1960 population of 2,400. Most domestic water is from wells, and although some of these wells have gone dry in periods of extreme drought, no evidence of ground water shortage exists. A County water system is recommended. It would obtain water from the City of Athens in neighboring Clarke County. There are presently no sewerage systems in Madison County. Sewerage systems are recommended for four of the larger communities in a 5-year improvement program. No other sewerage systems are proposed before 1985. (Poertner)
W74-02336

A WATER AND SEWER PLAN: WALTON COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.

Prepared for Northeast Georgia Area Planning and Development Commission, Athens, May 1968. 139 p, 15 fig, 13 tab, 3 appendices.

Descriptors: *Comprehensive planning, *Water supply, *Sewerage, *Regional development, Sewers, Water supply development, Data collections, Financing, *Georgia, Optimum development plans, Financial feasibility, Forecasting, *Rural areas.
Identifiers: *Walton County (Geo).

A water and sewer plan for Walton County was developed as a part of a comprehensive water and sewer plan for the Northeast Georgia Area

Planning and Development Commission. With financial assistance of the Farmers Home Administration of the USDA, the study centered on communities with a population of 5,500 or less and on rural areas. From a total population of 21,700 in 1966, the County is expected to grow to about 28,245 by 1990. The County is located about 40 miles east of Atlanta and has an average rainfall of 48 inches per year. Temperatures range from an average of 45F in winter to 80F in summer. Water resources appear to be adequate with two major rivers and numerous minor streams present in the area. Most water for domestic use on farms is obtained from wells. Three cities have a population in excess of 300, with one over 5,500. Five public water supply systems exist in the County. It is recommended that a county-wide water supply system be developed along major throughfares with the primary water supply furnished by the City of Monroe, the largest city in the County which is located at the approximate center. This would provide water to areas presently not served by public supplies. It could also augment existing systems. Sewerage systems, where they exist, are inadequate. Recommended improvements are not scheduled until 1985, for financial reasons. Only the two largest communities under the 5,500 population limit have public sewerage systems. (Poertner)
W74-02337

REGIONAL WASTEWATER FACILITIES STUDY.
Anderson-Nichols and Co., Inc., Concord, N.H.

Prepared for Upper Valley Planning and Development Council, Lebanon, New Hampshire, July 1972. 185 p, 32 fig, 24 tab, 42 ref, 15 appendices.

Descriptors: *Comprehensive planning, *Planning, *Waste water treatment, Waste water disposal, *Regional analysis, Regional development, *New Hampshire, *Vermont, Economies, Sewage treatment, Sewage disposal, Costs, *Treatment facilities.

The projected growth of the Upper Valley Planning and Development Council region in Vermont and New Hampshire makes it important that planned development be used for efficient growth. Seven urban areas are identified, with an estimated 1975 population of 37,530, which is expected to grow to 98,380 by 2020. Existing flow rates of waste water are about 4.1 mgd; by 2020 the flow rate is expected to be about 10.7 mgd. Six alternative methods for providing waste water collection and treatment were considered. These included both regional and individual systems. Current methods include collection systems in 3 cities, with treatment plants serving one city and a section of another. Municipal collection and treatment will be needed in 5 communities. Two phases for construction are outlined. An intra-state approach is recommended with all discharges to the Connecticut River. It is estimated that New Hampshire will be able to qualify for 95 percent grants, while Vermont programs will be able to receive grants of 90 percent. Total annual cost is estimated at $342,336 for the 5 communities. (Poertner)
W74-02338

NORTHEAST GEORGIA AREA WATER AND SEWER SYSTEMS PLAN AND CAPITAL IMPROVEMENT PROGRAM.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.
For primary bibliographic entry see Field 03D.
W74-02339

WATER QUALITY CHARACTERISTICS OF STORM SEWER DISCHARGES AND COMBINED SEWER OVERFLOWS,
Illinois State Water Survey, Urbana.
For primary bibliographic entry see Field 05B.
W74-02345

CHLORINATION EFFECTS ON ORGANIC CONSTITUENTS IN EFFLUENTS FROM DOMESTIC SANITARY SEWAGE TREATMENT PLANTS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 05C.
W74-02416

STABILITY AND REMOVAL OF COMMERCIAL DYES FROM PROCESS WASTEWATER,
Clemson Univ., S.C.
For primary bibliographic entry see Field 05B.
W74-02429

THE IMPACT OF WATER POLLUTION ABATEMENT ON COMPETITION AND PRICING IN THE ALABAMA STEEL INDUSTRY,
Auburn Univ., Ala. Water Resources Research Inst.
G. R. Rowe, Jr., and H. B. Pickle.
Available from the National Technical Information Service as PB-226 260 $4.75 in paper copy, $1.45 in microfiche. Bulletin 12, 1973. 150 p, 17 fig, 32 tab, 46 ref, 2 append. OWRR C-3292 (no 3715) (2).

Descriptors: *Economic impact, *Industrial wastes, *Pollution abatement, Prices, Value, Marketing, *Alabama, Waste water treatment, *Treatment facilities, *Cost analysis.
Identifiers: *Steel industry.

The steel industry is faced with the need for rebuilding and modernization in addition to pollution abatement. All of these factors are important in determining the total economc impact of water pollution abatement in the steel industry and are examined. The economic impact of water pollution abatement in the steel industry was measured by deriving data to determine the following: (1) The cost to steel firms of installing effluent treatment facilities. (2) The per unit cost increase due to pollution abatement firms will pass on to industrial users. (3) Shifts in purchasing by steel users due to the resulting increased price. (4) The per unit price increase due to pollution abatement industrial users will pass on to ultimate consumers. The present standards for water pollution control will not cause sufficient harm, by themselves, to severely affect the industry as a whole. The economic analysis of the industry has shown, however, that the combination of expenditures for water pollution abatement, air pollution abatement, installation of new technology and capacity, servicing of debt load, and paying for rising production factor costs will combine to create a considerable strain on the financial resources of iron and steel producers in years to come.
W74-02437

WATER-TREATMENT-SLUDGE FILTRATION STUDIES,
Auburn Univ., Ala. Dept. of Civil Engineering.
J. F. Judkins, Jr.
Available from the National Technical Information Service as PB-226 224 $3.00 in paper copy, $1.45 in microfiche. Alabama Water Resources Research Institute , Auburn Bulletin 15, 1973. 36 p, 12 fig, 5 tab, 22 ref. OWRR A-024-ALA (5).

Descriptors: Water treatment, Sludge, *Filtration, *Waste water treatment, *Sludge treatment.
Identifiers: *Alum sludge, *Lime-Softening Sludge, Crystal Seeding.

Research was conducted to examine the filtration characteristics of alum and lime-softening sludges and to determine if the crystal seeding process could be used to improve the filterability of the sludges. Although calcium hardness had no significant affect on the filterability of lime-softening sludge, magnesium hardness concentration was found to have a definite affect on the filterability of the sludge. Sludges high in magnesium content were more difficult to filter than sludges low in magnesium. Crystal seeding was found to be effective in improving the filterability of both alum sludge and lime-softening sludge. The size of crystal seed dosage, the mixing rate and the number of sludge recycles appear to be important factors in the crystal seeding process.
W74-02440

IMPACT OF SEWAGE TREATMENT MODIFICATIONS ON WATER QUALITY OF A RESERVOIR,
Tennessee Univ., Knoxville. Dept. of Civil Engineering.
J. D. Womack, J. C. Burdick, III, and F. C. Larson.
Water Resources Bulletin, Vol 9, No 1, p 100-115, February 1973. 6 fig, 17 ref.

Descriptors: *Water quality, *Sewage treatment, *Waste water treatment, Economics, *Public health, *Tennessee, Reservoir, Activated sludge, Treatment facilities, Costs.
Identifiers: *Fort Loudoun Reservoir (Tenn).

As a result of several investigations, dating from 1966 to the present, a rather comprehensive surveillance of water quality conditions has been maintained in Fort Loudoun Reservoir on the Tennessee River near Knoxville, Tennessee. During the period covered by these investigations, the Knoxville Third Creek Sewage Treatment Plant was upgraded from a primary plant to a secondary (activated sludge) treatment plant. Comparison of the collected data is being undertaken to elucidate the impact of these modifications upon water quality conditions in the reservoir.Consideration is given to the improvements of water quality as related to the expenditure for modification of the treatment facilities. In addition, comment is directed toward the public health significance of the water quality conditions determined.
W74-02483

METHOD FOR REMOVING SUSPENDED SOLIDS FROM LIQUIDS,
Ecodyne Corp., Chicago, Ill. (assignee).
B. L. Goodman, and J. W. McKibben.
U. S. Patent No. 3,764,525, 6 p, 9 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 915, No 2, p 638, October 9, 1973.

Descriptors: *Patents, *Waste water treatment, *Suspended solids, Industrial wastes, Municipal wastes, *Filtration, Screens, Water pollution control, Water quality control.

An improved method is provided for removing suspended solids from liquids by using a screen having a coating of the solids. Waste liquid is delivered to the screen with a directional component across the screen surface and a directional component through the screen. The screen has openings that are large enough to pass a majority of the suspended solids, and the screen has the ability to hold a layer of the solids on the upstream side. The flow of the liquid is controlled so that the coating is formed and maintained on the screen, and serves as a filtration medium. There is also a liquid filtration zone having a screen separating it into influent and effluent zones. (Sinha-OEIS)
W74-02484

NITRIFICATION OF BOD-CONTAINING WATER,
Union Carbide Corp., New York. (Assignee).
M. J. Stankewich, Jr.
U. S. Patent No. 3,764,523, 9 p, 6 fig, 3 tab, 5 ref; Official Gazette of the United States Patent Office, Vol 915, No 2, p 638, October 9, 1973.

Descriptors: *Patents, Oxygen, Carbon, Nitrogen, *Aeration, *Nitrification, *Waste water treatment, *Biological treatment, Microorganisms, Pollution abatement, Water pollution control, Water quality control, *Biochemical oxygen demand.

A method is presented for treating BOD-containing water by aeration in contact with activated sludge, settling sludge from the aeration and recycling sludge to the aeration zone as the activated sludge wherein the carbon food in the water is bio-chemically oxidized with at least 50 percent oxygen by volume feed gas. A feed stream comprising at least in part the carbon-depleted effluent water is passed to a nitrification zone. Oxygen-depleted aeration gas of at least 20 percent oxygen content is released from the nitrification zone, and nitrifying sludge from the zone is settled and wasted at a rate such that sludge retention time in the nitrification zone is 3-20 days, with part being recycled as the nitrifying sludge recycle. (Sinha-OEIS)
W74-02485

METHOD AND APPARATUS FOR ELECTROLYTIC TREATMENT OF SEWAGE,
Pacific Engineering and Production Co. of Nevada, Henderson. (assignee).
B. B. Halker.
U. S. Patent No. 3,764,500, 7 p, 15 fig, 7 ref; Official Gazette of the United States Patent Office, Vol 915, No 2, p 632, October 9, 1973.

Descriptors: *Patents, *Sewage treatment, *Electrolysis, *Disinfection, Odors, Color, *Waste water treatment, Pollution abatement, Water pollution control, Water quality control, Chemical oxygen demand, Biochemical oxygen demand.

The method and apparatus comprises the judicious application, at certain strategic locations in a sewage treatment plant, of electrolytic treatment of a portion or all of the stream. The apparatus includes one or more electrolytic assemblies employing anodes formed of a coating of lead dioxide on a substrate of graphite or titanium, and preferably includes a hollow, cylindrical metal tube which forms the cathode and with the anode contained therein and in the form of a cylindrical member whose outer surface is equidistantly spaced from the inner surface of the cathode container. Electrolyte flows through the assembly from an inlet conduit near the bottom to an outlet conduit near the top, and electrical connections are made to the exterior cathode can and to a portion of the anobe substrate which protrudes from the top of the assembly. The electrolytic treatment of all or a portion of the stream takes place to supplement the customary sewage treatment method. (Sinha-OEIS)
W74-02486

PROCESS FOR REMOVAL OF CONTAMINANTS FROM WASTES,
K. Okubo, and A. Ueno.
U. S. Patent No. 3,764,499, 5 p, 10 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 915, No 2, p 632, October 9, 1973.

Descriptors: *Patents, *Waste water treatment, *Metals, Copper, Zinc, Silver, Chromium, Cadmium, Pollution abatement, Water pollution control, Water quality control, Electrodes, *Electrolysis.

An electrolytic process is discussed for the removal of such contaminants as cyanides, and metals such as copper, zinc, silver, chromium, and cadmium. An electrolytic cell is partitioned by a membrane into at least two electrolytic chambers which are filled with electric conductors and positive and negative major electrodes forming an anode chamber and a cathode chamber in abutting relation through the membrane. The rinse water is selectively led into the anode or cathode chamber to effect the reduction and/or oxidation with decomposition of the toxic metals and cyanides so that the pollution concentration of the rinse water is lowered. The rinse water with less pollution is then moved through the membrane into the cathode or the anode chamber to bring a further reduction and/or oxidation with decomposition of the residual metals and cyanides. (Sinha-OEIS)
W74-02487

SEWAGE TREATMENT APPARATUS,
D. E. Owens.
U. S. Patent No. 3,764,011, 3 p, 6 fig, 5 ref; Official Gazette of the United States Patent Office, Vol 915, No 2, p 519, October 9, 1973.

Descriptors: *Patents, *Sewage treatment, Pollution abatement, *Aeration, *Chlorination, Water pollution control, *Waste water treatment.
Identifiers: Portable equipment, Gravity flow.

A portable self-contained sewage treatment plant particularly designed to meet the needs of small sub-divisions contains within a single tank body an aeration chamber, a settlement chamber and a chlorination chamber. The plant features an aeration system which also serves to power jets for the return of heavy and light solids from the settlement chamber into the aeration chamber. A floating skimmer in the settlement chamber removes light solids from the surface of the liquid for delivery to one return jet. Liquid from the settlement chamber flows into the chlorination chamber and clear effluent is discharged from the latter. (Sinha-OEIS)
W74-02489

CANYON PUBLIC SERVICE DISTRICT V. TASA COAL COMPANY (EMINENT DOMAIN PROCEEDING HELD PUBLIC SERVICE DISTRICT HAD RIGHT TO CONDEMN DEFENDANT'S LANDS FOR USE IN CONNECTION WITH SEWER FACILITIES, DEFENDANT APPEALS).
For primary bibliographic entry see Field 06E.
W74-02531

REGIONAL WATER, SEWAGE, AND SOLID WASTE DISTRICTS.

Ind. Ann. Stat. secs 27-2801 thru 27-2844 (1970).

Descriptors: *Legislation, *Sewage systems, *Indiana, *Solid wastes, Ultimate disposal, Water quality, Water pollution sources, Disposal, Legal aspects, Water quality control, Water resources development, Water districts.

Indiana Annotated Statutes deal with regional water, sewage, and solid waste districts. The statutes provide that any area situated in any unincorporated part of one or more contiguous counties or in one or more municipal corporations, or both, may be organized as a regional water, sewage and solid waste district in the manner and subject to the conditions provided in the act in order to provide a water supply for domestic, industrial and public use to users within and without the district. Moreover, they may be established to provide for the collection and disposal of storm and sanitary sewage and other liquid waste within and without the district and to provide for the collection and disposal of solids waste and refuse within and without the district. Following the purposes and various definitions, the statutes provide for hearings, petitioning procedures, organization of the districts, the applicability of eminent domain, revenue bonds, special assessments, referendums, and various other procedures to provide water supply systems and sewerage systems. (Mockler-Florida)
W74-02535

WATER RECYCLING OF SEWAGE EFFLUENT BY IRRIGATION: A FIELD STUDY ON OAHU,
Hawaii Univ., Honolulu. Water Resources Research Center.
For primary bibliographic entry see Field 02B.
W74-02631

ELECTROCHEMICAL FLOTATION CONCEPT FOR REMOVING OIL FROM WATER,
Lockheed Aircraft Service Co., Ontario, Calif.
Q. H. McKenna, H. H. Helber, L. M. Carrell, and R. F. Tobias.
Available from NTIS as AD-760 056. Final Report No. 734305.2/4, prepared for Coast Guard Office of Research and Development, January 1973. 131 p, 20 fig, 31 tab, 7 ref. DOT-CG-24288-A.

Descriptors: Pollution sources, *Waste water treatment, *Oily water, Bubbles, *Separation techniques, Costs, *Pollution abatement, *Water quality control.
Identifiers: Electrochemical flotation, Bilge water, Flotation, Water pollution prevention.

A study was undertaken to determine the feasibility of an electrochemical flotation system for separating oil from bilge water. This system involves flotation, using electrolytically-produced micro-gas bubbles, subsequent to coagulation and/or adsorption of oily impurities in the water. Initial electroflotation tests were conducted in batch modules to determine the chemical treatment necessary to achieve the desired separation of the entire spectrum of oil-brackish water combinations. Addition of NaOH to adjust the pH to approximately 10 along with 10-15 ppm of anionic polyelectrolyte was the only pretreatment necessary for all oily waters tested. Processing of real bilge waters as well as simulated bilge and ballast waters in the continuous flow modules produced optically clear effluent waters with less than 10 ppm residual oil. Emulsified oil concentrations in the influent stream were as high as 3000-4000 ppm. The operating temperature of the system is restricted to temperatures below 110F. Ship motions of 10 deg pitch and 15 deg roll up to a frequency of 6 cycles per minute did not interfere with the normal operation of the system. Pilot plant data were used to estimate the costs of systems with capacities of 30, 100, and 1000 gpm. The total capital costs are $31,320, $80,500 and $600,000, respectively, while the total operating cost per 1000 gallons is $0.77. (Sinha-OEIS)
W74-02634

INVESTIGATION OF SORBENTS FOR REMOVING OIL SPILLS FROM WATERS,
Naval Ship Research and Development Center, Annapolis, Md.
For primary bibliographic entry see Field 05G.
W74-02636

5E. Ultimate Disposal of Wastes

DETERMINATION OF THE MECHANICAL COMPATIBILITY OF POROUS ROCKS WITH WASTE WATER IN ITS SUBSURFACE DISPOSAL,
Ustredni Ustav Geologicky, Brno (Czechoslavakia).
For primary bibliographic entry see Field 05B.
W74-02165

PULP AND PAPER MILL SLUDGE UTILIZATION AND DISPOSAL,
Crown Zellerbach Corp., Camas, Wash. Environmental Services Div.
For primary bibliographic entry see Field 05D.
W74-02278

BACTERIAL PROTEIN FROM PAPER MILL SLUDGES,
Forest Service (USDA), Madison, Wis. Forest Products Lab.
J. M. Harkin, and D. L. Crawford.
In: TAPPI Environmental Conference, San Francisco, May 14-16, 1973. Preprinted Proceedings TAPPI, Atlanta, Ga., p 145-151, 4 tab, 25 ref.

Descriptors: *Sludge treatment, *Byproducts, *Pulp wastes, *Proteins, *Fermentation, *Actinomycetes, Bacteria, Cellulose, Thermophilic bacteria, Foods, Pulp and paper industry, Enzymes, Food processing industry, Microorganisms, *Waste water treatment, Industrial wastes.
Identifiers: Thermonospora fusca.

Thermonospora fusca is a strongly cellulolytic thermophilic filamentous actinomycete which grows well on various pulps and pulp mill fines (fine fibers) of low lignin contents. Fermentation of such materials with this bacterium at 55 C achieves a considerable reduction in their volume while producing a readily harvestable high-value protein. Thermophilic fermentations of paper mill effluent sludges might be used in waste disposal systems or for production of animal or poultry feed protein. Extracellular enzymes in the spent fermentation broth are byproducts that could find new uses in the food and beverage industries or in the paper industry itself for stock preparation. (See also W74-02273) (Brown-IPC)
W74-02282

IMPROVING REVERSE OSMOSIS PERFORMANCE WITH DYNAMICALLY FORMED WOOD CHEMICAL MEMBRANES,
Institute of Paper Chemistry, Appleton, Wis.
For primary bibliographic entry see Field 05D.
W74-02286

HYDROGEOLOGIC ASPECTS OF A PROPOSED SANITARY LANDFILL NEAR OLD TAMPA BAY, FLORIDA,
Geological Survey, Tallahassee, Fla.
R. N. Cherry, and D. P. Brown.
Open-file report 73015, 1973. 25 p, 8 fig, 3 tab, 9 ref.

Descriptors: Baseline studies, *Landfills, *Hydrogeology, *Groundwater movement, *Florida, Aquifers, Aquifer characteristics, Waste disposal, Garbage dumps, Planning, Sanitary engineering, Environmental control, Water pollution control, Environmental sanitation, Data collections, Evaluation.
Identifiers: *Clearwater (Fla).

The proposed sanitary landfill site for the city of Clearwater is in east-central Pinellas County near Old Tampa Bay. The area of the site is about 320 acres. The site is about 50 feet above mean sea level and is partly drained by two unnamed streams. One stream is a tributary of the Lake Tarpon outfall canal; the other stream, a tributary of Bishop Creek, drains into the north end of Old Tampa Bay. The two aquifers in the area are: a shallow aquifer, which is composed of sand containing a limestone zone, and the Floridan aquifer, which is composed of limestone. At the site of the proposed landfill, the two aquifers are separated by an average of 35 feet of clay that forms a confining layer of low vertical permeability. The head difference between the shallow and Floridan aquifers is 40 feet, and the rate of vertical movement within the proposed landfill site from the shallow aquifer through the clay layer to the underlying Floridan aquifer is estimated to be 32,000 gpm in an area of 320 acres. The site could be made hydrologically favorable for a sanitary landfill if some precautions are taken. A perimeter canal could intercept water leaving the site. Also, maintaining a monitoring system would allow early detection of possible movement of contaminated water. (Woodard-USGS)
W74-02628

5F. Water Treatment and Quality Alteration

SOME REGULARITIES OF SR90 ACCUMULATION IN THE BODY OF A RAT WITH A HIGH FLUORINE CONTENT IN ITS DRINKING WATER, (IN RUSSIAN),
For primary bibliographic entry see Field 05C.
W74-02195

SIXTEEN YEARS OF WATER FLUORIDATION IN THE NETHERLANDS AND ITS INFLUENCE ON DENTAL DECAY,
Utrecht Rijksuniversiteit (Netherlands). Microbiology Lab.
G. W. Kwant.
Fluoride, Vol 6, No 1, p 49-56, 1973, Illus.
Identifiers: *Dental decay, *Fluoridation, *Netherlands, Historical studies, Water treatment, Public health.

For the Dutch fluoridation project, the towns of Culemborg and Tiel were selected after sociological screening. Tiel was fluoridated up to 1.1 mg/l in March 1953, and compared to Culemborg with a fluoride concentration of 0.1 ppm in its drinking water. In this experiment, caries were diagnosed in different sites. This method permitted a better insight into the total number of cavities in a dentition. It also showed that fluoridation did not have the same effect on all tooth surfaces. Caries of the proximal surfaces was diagnosed with the aid of X-rays, whereas all other sites were evaluated clinically. The main study groups, consisting of children 11-15 yr-old, were examined every second year. Each age class in these groups consisted of about 70 boys and 70 girls. All these children were born and had resided either in Tiel or in Culemborg all their lives. During the course of these 16 yrs, the caries frequency in Culemborg increased whereas it decreased in Tiel. (See also W74-02230)--Copyright 1973, Biological Abstracts, Inc.
W74-02229

COMMENTS ON THE PAPER BY G. W. KWANT 'SIXTEEN YEARS OF WATER FLUORIDATION IN THE NETHERLANDS AND ITS INFLUENCE ON DENTAL DECAY,'
Institute of Environmental Research, Graz (Austria).
R. Ziegelbecker, and H. M. Thomson.
Fluoride, Vol 6, No 1, p 57-63, 1973, Illus.
Identifiers: Child, Decay, Dental, Fluoridation, G, Kwant, Netherlands, Paper, W, Water, Years.

The article by G. W. Kwant which purports to prove fluoridation a success in the Netherlands exhibits serious shortcomings. They pertain to the following: selection of an adequate control city; proper sampling of the children; lack of essential data; and faulty interpretation of the results. Factors other than fluoride were given no consideration nor were the long-term effects on older children and adults evaluated; these are requisites for conclusions regarding the total dental effects. (See also W74-02229)--Copyright 1973, Biological Abstracts, Inc.
W74-02230

REMOVAL OF ORGANIC MATERIAL BY ADSORPTION ON ACTIVATED CARBON,
Chemviron S.A., Brussels (Belgium).
For primary bibliographic entry see Field 05D.
W74-02264

THE REMOVAL OF ORGANIC COMPOUNDS IN THE PRODUCTION OF POTABLE WATER,
Water Research Association, Marlow (England).
R. B. Gauntlett, and R. F. Packham.
Chemistry and Industry, No 17, p 812-817, September 1, 1973. 1 tab, 5 fig, 19 ref.

Descriptors: *Water treatment, *Potable water, Odor, Taste, Color, *Coagulation, *Adsorption, *Oxidation, *Filtration, *Chlorination, Ozone, Chlorine, Activated carbon, Humic acids, Fulvic acids, Phenols, Oil, Hydrocarbons, Chlorine compounds, Manganese, Iron, Water treatment, Surface waters.
Identifiers: Chlorine dioxide, Potassium permanganate, Precipitation (Chemical), Oxidants, Manganese dioxide, Manganese compounds.

Surface water constituents contributing to objectionable taste, odor, and color include mainly humic and fulvic acids leached from peaty and other soils. Pollutants having low odor thresholds include diesel oil and chlorinated phenols. Water purification methods for public consumption involve mainly chemical precipitation, using aluminum sulfate or similar coagulants; adsorption, usually on activated carbon; and/or oxidation by means of chlorine, chlorine dioxide, ozone, or potassium permanganate. More than one of these processess may be needed to remove all objectionable material. Principles for selection of the best sequence must consider possible antagonism between treatment methods, as well as the multifunctionality of any one process. Thus, activated carbon beds should be used after filtration, but before chlorination, since they gain efficiency by prolonged contact, but are cloggingprone and also effective dechlorinizers. The effluent from adsorption columns, which provide sites for bacterial growth, should be disinfected. Permanganate must be added before coagulants, so that any manganese dioxide formed is coprecipitated. Ozonization should usually be the final step for economic reasons and to avoid oxidative degradation of adsorbed organics into less easily removable products. Other oxidants are also best applied last, except for removal of Fe or Mn. Local circumstances may dictate deviations from these rules. (Brown-IPC)
W74-02265

CONCENTRATION OF ENTEROVIRUSES FROM LARGE VOLUMES OF WATER,
Baylor Coll. of Medicine, Houston, Tex. Dept. of Virology and Epidemiology.
M. D. Sobsey, C. Wallis, M. Henderson, and J. L. Melnick.
Applied Microbiology, Vol 26, No 4, p 529-534, October 1973. 4 tab, 1 fig, 11 ref.

Descriptors: *Public health, *Potable water, *Viruses, *Water analysis, *Water treatment, *Aquatic microorganisms, Filtration, Adsorption, Monitoring, Membrane processes, Filters, Freshwater.
Identifiers: Poliomyelitis, Cellulose nitrate, Fiberglass, Epoxy resins.

Upon acidification of large volumes of clean water, viruses can be efficiently absorbed to epoxy-fiberglass and cellulose nitrate filters in the absence of exogenously added salts. Based on this finding, a modified virus-concentrating system for the monitoring of clean waters was developed. The water to be tested is acidified by injection of 1N HCl and passed through a fiberglass cartridge depth filter and an epoxy-fiberglass membrane filter in series. The adsorbed viruses are then eluted with 1 liter of eluent at pH 11.5 and reconcentrated by adosorption on and elution from a series of small epoxy-fiberglass filters. Using this method, small quantities of polio virus in 100-gal volumes (378.5 liter) of tapwater were concentrated nearly 40,000-fold with an average virus recovery efficiency of 77%. (Brown-IPC)
W74-02271

FOURTH ANNUAL REPORT, CITY OF CARBONDALE, ILLINOIS, WATER AND WASTEWATER TREATMENT.
Carbondale Dept. of Public Works, Ill.
For primary bibliographic entry see Field 05D.
W74-02328

WATER-TREATMENT-SLUDGE FILTRATION STUDIES,
Auburn Univ., Ala. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05D.
W74-02440

PUBLIC WATER SUPPLIES--CHLORINATION.
Illinois State Environmental Protection Agency, Springfield. Div. of Public Water Supplies.
For primary bibliographic entry see Field 05G.
W74-02538

PUBLIC WATER SUPPLIES.
Illinois State Environmental Protection Agency, Springfield. Div. of Public Water Supplies.
For primary bibliographic entry see Field 05G.
W74-02539

5G. Water Quality Control

MINIMIZING NITRATE SEEPAGE FROM THE HULA VALLEY INTO LAKE KINNERET (SEA OF GALILEE): 1. ENHANCEMENT OF NITRATE REDUCTION BY SPRINKLING AND FLOODING,
Technion-Israel Inst. of Tech., Haifa. Soils and Fertilizers Lab.
For primary bibliographic entry see Field 05B.
W74-02153

PLANT NUTRIENT CONCENTRATIONS IN RUNOFF FROM FERTILIZED CULTIVATED EROSION PLOTS AND PRAIRIE IN EASTERN SOUTH DAKOTA,
South Dakota State Univ., Brookings. Dept. of Soils.
For primary bibliographic entry see Field 05B.
W74-02154

THE EFFECTS OF ACID MINE WATER ON GROWTH (NUMBER AND SIZE) OF CHLORELIA VULGARIS,
West Virginia Univ., Morgantown. Dept. of Biology.
For primary bibliographic entry see Field 05C.
W74-02168

THE GROWTH OF CHLORELLA VULGARIS IN SEWAGE AND ACID MINE WATER,
West Virginia Univ., Morgantown. Dept. of Biology.
For primary bibliographic entry see Field 05C.
W74-02169

URBAN STORM DRAINAGE ACTIVITIES IN NEW YORK,
Soil Conservation Service, Albany, N.Y.
For primary bibliographic entry see Field 04A.
W74-02171

IN SITU TREATMENT METHODS FOR HAZARDOUS MATERIAL SPILLS,
Calspan Corp, Buffalo, N.Y.
For primary bibliographic entry see Field 05D.
W74-02179

ORGANIC FILMS ON NATURAL WATERS: THEIR RETRIEVAL, IDENTIFICATION, AND MODES OF ELIMINATION,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 05A.
W74-02182

APPLICABILITY OF THE INTERCEPTOR WATERWAY CONCEPT TO THE ROOKERY BAY SANCTUARY,
Tropical Bioindustries Development Co., South Miami, Fla.
For primary bibliographic entry see Field 04A.
W74-02205

OPTIMIZATION OF INDUSTRIAL SYSTEMS WITH THE SEPARABLE PROGRAMMING AND THE GENERALIZED REDUCED GRADIENT METHODS,
Kansas State Univ., Manhattan. Dept. of Industrial Engineering.
J. L. Williams.
Available from the National Technical Information Service as PB-226 187, $15.75 in paper copy, $1.45 in microfiche. M.S. Thesis, 1972. 265 p, 44 fig, 5 tab, 48 ref. OWRR A-038-KAN (4). 14-31-0001-3216.

Descriptors: *Optimization, *Computer programs, Model studies, Water quality, *Industries, Mathematical studies.
Identifiers: *Water quality control systems, *Geometric programming, *Gradient methods, Nonlinear programming.

Two nonlinear programming methods and their application to industrial systems are reviewed. Separable programming is described and exemplified. The same procedure is presented that is used in the separable programming subroutine of the Mathematical Programming System/360 (MPS/360). A supplemental FORTRAN program for assisting the usage of MPS/360 when solving separable programming problems is presented. An interesting application of separable programming to solve the geometric programming dual problem with N-degrees of difficulty is also exhibited. The second technique considered is the generalized reduced gradient method. The mathematical theory is presented and numerical examples are used to exemplify it. Its application via the GREG program is evaluated, and numerous computer examples are worked. The study is concluded with the application of the technique to optimize a water quality control model.
W74-02213

COST EFFECTIVENESS OF CURRENT ENVIRONMENTAL ENGINEERING PRACTICES,
Camp, Dresser and McKee, Boston, Mass.
For primary bibliographic entry see Field 05D.
W74-02225

ATTEMPT AT MOLLUSK CONTROL BY INCREASING THE PLANKTONIC BIOMASS AND BY MOLLUSCICIDAL TREATMENT: THE UREA-N-TRITYLMORPHOLINE ASSOCIATION (IN FRENCH),
Institut Tropical Suisse, Basel.
For primary bibliographic entry see Field 05C.
W74-02226

ECONOMIC ASPECTS OF ENVIRONMENTAL PROTECTION (IN GERMAN),
D. Karsten.
Zentralbl Bakteriol Parasitenkd Infektionskr Hyg Erste Abt Urig Reihe B Hyg Praev Med, Vol 155, No 3, p 330-339, 1971, English summary.
Identifiers: Economics, *Environmental protection, Sewage, *Cost analysis, *Pollution-costs (Public).

Industrial firms, public bodies and households frequently save expenditure e.g., for sewage purification, by dumping refuse into the environment. The community has to bear costs which arise through private activities. Pollutors should pay a sum equivalent to the estimated cost of the damage caused. The economic damage must be determined by means of utilization cost analysis.--Copyright 1973, Biological Abstracts, Inc.
W74-02227

THE PROSPECTS OF USING THE RYBINSK WATER STORAGE BASIN FOR FISHERIES, (IN RUSSIAN),
For primary bibliographic entry see Field 08I.
W74-02241

(TAPPI) ENVIRONMENTAL CONFERENCE, MAY 14-16, 1973.
Technical Association of the Pulp and Paper Industry, Atlanta, Ga.
For primary bibliographic entry see Field 05D.
W74-02273

THE CPAR PROGRAM - GOVERNMENT-INDUSTRY COOPERATION IN POLLUTION ABATEMENT RESEARCH,
Department of the Environment, Ottawa (Ontario).
For primary bibliographic entry see Field 05D.
W74-02274

EFFECTS OF HIGHWAY BRIDGE CONSTRUCTION ON A SUBARCTIC STREAM,
For primary bibliographic entry see Field 04C.
W74-02295

WATER QUALITY MANAGEMENT IN GROUNDWATER BASINS,
Arizona Univ., Tucson. Dept. of Hydrology and Water Resources.
For primary bibliographic entry see Field 05B.
W74-02356

STATE WATER PLAN, PROCEEDINGS OF 18TH ANNUAL NEW MEXICO WATER CONFERENCE.
For primary bibliographic entry see Field 06B.
W74-02456

IMPACT OF SEWAGE TREATMENT MODIFICATIONS ON WATER QUALITY OF A RESERVOIR,
Tennessee Univ., Knoxville. Dept. of Civil Engineering.
For primary bibliographic entry see Field 05D.
W74-02483

APPARATUS FOR CONFINING FLOATING POLLUTANTS,
E. H. Rolfson.
U. S. Patent No. 3,764,015, 3 p, 8 fig, 10 ref; Official Gazette of the United States Patent Office, Vol 915, No 2, p 520, October 9, 1973.

Descriptors: *Patents, *Oil spills, *Oil pollution, Water quality control, *Pollution abatement, Equipment, *Separation techniques.

A sizeable number of substantially rectangular buoyant lightweight and fire-proof platforms are provided which are connected in series and adapted to be towed to the site while flat, made to surround the area from which the pollutants are to be removed, and then rotated approximately 180 degrees on their axes to assume a substantially vertical position. While in vertical position these substantially rectangular platforms are adjustable as to the depth to which they extend. After the pollutants have been removed to a satisfactory extent, the platforms are rotated on their longitudinal axes to assume their initial flat position, and then towed away while still serially connected as before. Means for effecting the rotational movement of each of the substantially rectangular platforms is provided by one or more elongated tanks which extend transversely of the platforms, and which are divided by an airtight partition into an airtight flotation compartment and an airtight ballast compartment, together with means for adjusting the quantity of water in each of the ballast tanks; also

for adjusting the depth to which the platforms extend into the water when in their vertical positions. (Sinha-OEIS)
W74-02488

OIL SKIMMING APPARATUS,
Cities Service Oil Co., Tulsa, Okla. (Assignee).
J. W. Penton.
U.S. Patent No. 3,762,556, 4 p, 2 fig, 11 ref; Official Gazette of the United States Patent Office, Vol 915, No 1, p 161, October 2, 1973.

Descriptors: *Patents, *Skimming, *Oil spills, *Oil pollution, Separation techniques, Equipment, Water pollution control, Water quality control, *Pollution abatement.

An oil skimming apparatus is comprised of a floating housing placed within a body of water, for example a settling pond, which has an oil slick. The housing includes multiple, interconnected hinged gates to provide weirs over which the oil slick can spill into an oil sump within the housing. Oil which accumulates within the housing is pumped out of the sump into a storage vessel. The interconnected hinged gates are counterbalanced to hold them in a normally upright position, but as oil is pumped from the housing the interconnected gates fall inwardly into the housing at a slight angle so that oil spills over the gates into the sump while also prevent excessive inflow of water. The housing has multiple compartments defined by the gates. Water is removed from the compartments through piping which communicates with the lower region of each compartment. (Sinha-OEIS)
W74-02491

UNDERWATER TANKER BALLAST WATER/OIL SEPARATION,
Chicago Bridge and Iron Co., Oak Brook, Ill. (Assignee).
J. S. McCabe.
U.S. Patent No 3,762,548, 3 p, 3 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 915, No 1, p 158, October 2, 1973.

Descriptors: *Patents, *Oil pollution, *Separation techniques, Gravity, *Pollution abatement, Water quality control, Water pollution control.
Identifiers: Ballast.

Ballast water contaminated with entrained or emulsified oil is transferred to an underwater disengagement zone operating on the water displacement principle, as exemplified by an underwater storage tank having an upward convex shell with an opening in its bottom through which water can move into and out of the shell. In the disengagement zone, the ballast is separated under the influence of gravity, into separate oil and water phases. The oil rises to a point which it can be recovered. The separated water flows out of the open bottom of the zone into the body of water. (Sinha-OEIS)
W74-02492

FLOATING WATER JET FOR OIL SLICK CONTROL,
Department of the Navy, Washington, D.C.
D. J. Graham.
U. S. Patent No. 3,762,169, 3 p, 3 fig, 4 ref; Official Gazette of the United States Patent Office, Vol 915, No 1, p 61, October 2, 1973.

Descriptors: *Patents, Separation techniques, *Oil spills, *Oil pollution, *Pollution abatement, Water pollution control, Water quality control.

An oil containment boom comprises a flexible rubber hose having attached floats placed at spaced intervals. Water jets are connected to the hose between the floats and counterweights are added to balance the unit. A water pump provides low pressure water to a hose which is sprayed through the jets against the oil slick, forcing it to the recovery mechanism. (Sinha, OEIS)
W74-02494

WATER POLLUTION CONTROL,
R. L. Pardee.
U. S. Patent No. 3,762,168, 3 p, 3 fig, 8 ref; Official Gazette of the United States Patent Office, Vol 915, No 1, p 61, October 2, 1973.

Descriptors: *Patents, Barriers, *Skimming, *Flotsam, *Oil pollution, *Oil spills, *Pollution abatement, Water quality control, Water pollution control, Equipment.

The skimmer consists of a barrier which can be placed at an acute angle to the flow of water to divert an upper portion of the water striking it. The debris (pollutants) are directed to a collecting area. The barrier may also be used to protect an offshore working area, such as an oil well rig. The barrier is mounted so that it will automatically rise and fall with the changing level of the waterway. The barrier is formed with vertical loops or sleeves at its opposite ends to receive upright posts rigidly supported. Suitable bearings may be interposed between the posts and loops to permit free vertical movement of the barrier. (Sinha-OEIS)
W74-02495

DEVELOPMENT OF THE FREEDOM OF SCIENTIFIC RESEARCH ISSUE OF THE THIRD LAW OF THE SEA CONFERENCE,
Rhode Island Univ., Kingston.
For primary bibliographic entry see Field 06E.
W74-02501

CHALLENGES TO FEDERALISM: STATE LEGISLATION CONCERNING MARINE OIL POLLUTION,
Oregon Univ., Eugene. School of Law.
P. N. Swan.
Ecology Law Quarterly, Vol 2, No 3, p 437-470, Summer 1972. 219 ref.

Descriptors: *Oil pollution, *Water pollution, *Florida, *Legislation, Judicial decisions, Legal aspects, Oil industry, Law enforcement, Oil wastes, Water pollution sources, Disasters, Chemical wastes, Water quality.

The recent case decision holding a state statute invalid due to the inability of the states to legislate within admiralty jurisdiction is criticized, arguing that this principle is not constitutionally mandated. Other challenges to the statute--that it violates the commerce clause, or is prempted by the Federal Water Quality Improvement Act--are also discussed. The preventive provisions of the statute should be upheld by the Supreme Court when it hears the case on appeal. The state statute was designed to serve five basic purposes: to confer licensing authority; to regulate the deliverance and transference of hazardous materials, including oil and petroleum products; to establish a compensation and control expense fund; to make terminal operations and carriers strictly liable for pollution damage; and to make them responsible for removing escaped pollutants. Until the federal government takes greater initiative in the areas of pollution prevention and clean up, state remedies such as those under the statute in question should be held valid. (Mockler-Florida)
W74-02502

LEGAL DEVELOPMENTS IN CANADIAN WATER MANAGEMENT,
Department of the Environment, Ottawa (Ontario).
For primary bibliographic entry see Field 06E.
W74-02505

GROUNDWATER POLLUTION IN THE WESTERN STATES--PRIVATE REMEDIES AND FEDERAL AND STATE LEGISLATION,
S. J. Nixon.
Land and Water Law Review, Vol 8, p 537-564, 1973. 193 ref.

Descriptors: *Water pollution, *Groundwater, *Remedies, Water Quality Act, Federal Water Pollution Control Act, Pollution abatement, Legal aspects, Legislation, Water quality control.
Identifiers: Water Pollution Control Act Amendments of 1972.

Remedies against groundwater pollution on the private, state, and federal levels have been clearly established by precedent as well as recent legislation. Private remedies have been stressed by both federal and state legislation. State groundwater quality standards, which should be established, may simplify the burden of proof for the private litigant and the state enforcement authority. Regulative legislation as well as preventative and compensatory private action are discussed. Private remedies including private nuisance, public nuisance, negligence, other general remedies and defenses are discribed. Also considered are state legislation and federal legislation, including legislative history. (Sears-Florida)
W74-02506

PROPER TIME LIMITATIONS ON OUTER CONTINENTAL SHELF LEASES UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT,
For primary bibliographic entry see Field 06E.
W74-02509

GUIDELINES FOR THE COASTAL ZONE.
Coastal Plains Center for Marine Development Services, Wilmington, N.C.
For primary bibliographic entry see Field 02L.
W74-02510

MICHIGAN STATE WATER POLLUTION CONTROL PLAN.
Michigan Water Resources Commission, Lansing.

June 1973. 125 p, 9 tab, 4 chart.

Descriptors: *Water quality control, *Water quality act, *Michigan, Water control, Water resource development, Water quality standards, Pollution standards, Water permits, Legal aspects, Administration, Governments, Comprehensive planning, Water management (Applied), Water policy.

Michigan's official water pollution control plan for fiscal year 1974 is presented. This document represents the third step in the planning process developed in response to the federal water quality act. The first step consisted of a continuing planning process followed by a second document on the state's water strategy for fiscal year 1974. This third document includes plans for monitoring, issuing permits for pollution discharge, enforcement, training and administration of the state's water resources and supply. An output summary and resource need chart for the state are included. (Daniels-Florida)
W74-02511

RIVER BASIN MONETARY AUTHORIZATIONS--DISASTER RELIEF ACT AMENDMENTS.
For primary bibliographic entry see Field 06E.
W74-02516

ENVIRONMENTAL PROTECTION ACT OF 1973, FIRST SESSION ON S.1104.
For primary bibliographic entry see Field 06E.
W74-02518

STATE OF NEW JERSEY, DEPARTMENT OF ENVIRONMENTAL PROTECTION V. JERSEY CENTRAL POWER AND LIGHT COMPANY (ACTION TO ENFORCE PENALTY PROVISION FOR DISCHARGE OF HARMFUL SUBSTANCE INTO TIDAL WATERS).
For primary bibliographic entry see Field 06E.
W74-02520

BARTA V. BRINEGAR (CIVIL ACTIONS BROUGHT AGAINST FEDERAL AND STATE OFFICIALS SEEKING TO ENJOIN CONSTRUCTION OF HIGHWAY SEGMENT UNTIL COMPLETION OF ENVIRONMENTAL IMPACT STUDY).
For primary bibliographic entry see Field 06E.
W74-02521

U.S. V. AMERICAN CYANAMID COMPANY (ACTION FOR DISCHARGE INTO NAVIGABLE WATERWAYS).
For primary bibliographic entry see Field 06E.
W74-02522

ENVIRONMENTAL DEFENSE FUND, INC. V. FROEHLKE (ACTION BROUGHT FOR DECLARATORY JUDGMENT AND INJUNCTION RESTRAINING COMPLETION OF RESERVOIR PROJECT).
For primary bibliographic entry see Field 06E.
W74-02524

STATE OF MAINE V. M/V TAMANO (SUIT TO RECOVER DAMAGES INCURRED AS RESULT OF DISCHARGE INTO WATERS OF BAY).
For primary bibliographic entry see Field 06E.
W74-02525

UNITED STATES V. LINDSAY (GOVERNMENT'S ACTION AGAINST CITY FOR ALLEGED VIOLATION OF REFUSE ACT AND NEW YORK HARBOR ACT, AND FOR CREATION OF PUBLIC NUISANCE).
For primary bibliographic entry see Field 06E.
W74-02526

A BILL TO PRESCRIBE PROCEDURES SO AS TO MAKE ADMINISTRATION OF THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 MORE EFFECTIVE.
For primary bibliographic entry see Field 06E.
W74-02528

REGIONAL WATER, SEWAGE, AND SOLID WASTE DISTRICTS.
For primary bibliographic entry see Field 05D.
W74-02535

PUBLIC WATER SUPPLIES--CHLORINATION.
Illinois State Environmental Protection Agency, Springfield. Div. of Public Water Supplies.

Technical Release No. 10-2, September 14, 1972. 5 p, 6 fig.

Descriptors: *Illinois, *Public health, *Water supply, *Water treatment, *Water quality control, *Chlorination, Chemicals, Engineering, Pollution abatement, Surface waters, Groundwater, Limestone, Sanitary engineering.

Treatment by continuous and adequate chlorination is required by the State of Illinois in the following instances: when the supply is obtained from a surface source; when the supply is exposed to contamination during the course of treatment; when groundwater sources are or may become contaminated; or where local conditions, i.e. flooding indicates that a factor of safety is desirable to guarantee the quality of the supply. Chlorination is not considered as a substitute for a proved sanitation practice. Two major factors are considered with respect to chlorinator capacities. The first is basic requirements, meaning sufficient capacity available to satisfy immediate chlorine demand and give a true residual of at least triple that indicated by the accompanying set of curves for free or combined chlorination. Certain local conditions are to be considered such as pH, water temperature, contact time, presence of nitrogenous compounds, etc. The second factor is normal design requirements. Other areas covered are: chlorine feed equipment, spare chlorinator parts, location of equipment and parts, chlorine gas masks, weighing scales, and residual chlorine testing kit. (Napolitano-Florida)
W74-02538

PUBLIC WATER SUPPLIES.
Illinois State Environmental Protection Agency, Springfield. Div. of Public Water Supplies.

Technical Release No. 10-1, September 14, 1972. 2 p.

Descriptors: *Illinois, *Protection, *Pollution abatement, Pollutant identification, Technical writing, Septic tanks, Cesspools, Sewers, Seepage, Ponds, Subsurface waters, Oil pollution, Floodwater, Wells, Reservoir sites, Filters.

The Illinois Environmental Protection Agency has promulgated specific minimum distances between certain sources of contamination and public water supply structures. The sources of contamination considered are: privies, septic tanks, cesspools; sewers (storm and sanitary); subsurface seepage-disposal lines; pits or ponds receiving surface waters, oil, grease, etc; and flood waters. Structures to be protected are: wells, clear-water reservoirs, gravity filters, section lines, iron-removal and chlorine reaction basins, and wet-salt-storage basins. A chart is included specifying the distance from each source of contamination. The minimum distances are given for clay and loam soils with the stipulation that when structures are to be located in more pervious soils, such as sand or gravel, the minimum distances are to be increased accordingly. Caution is urged regarding the location of structures in areas where creviced limestone may be disturbed. If structures requiring isolation from contamination are to be located in such areas, advice from the agency should be sought. (Napolitano-Florida)
W74-02539

SUBMERGED LANDS.
For primary bibliographic entry see Field 06E.
W74-02540

HYGIENIC CONDITIONS IN THE PROCUREMENT OF DRINKING WATER FROM INDIVIDUAL SOURCES (IN GERMAN),
For primary bibliographic entry see Field 05B.
W74-02547

ERTS-1 INVESTIGATION OF ECOLOGICAL EFFECTS OF STRIP MINING IN EASTERN OHIO,
Bendix Corp., Ann Arbor, Mich.
For primary bibliographic entry see Field 07B.
W74-02572

APPLICATION OF ERTS-1 DATA TO THE PROTECTION AND MANAGEMENT OF NEW JERSEY'S COASTAL ENVIRONMENT,
Earth Satellite Corp., Washington, D.C. Geosciences and Environmental Applications Div.
For primary bibliographic entry see Field 07B.
W74-02579

HYDROCARBON-OXIDIZING BACTERIA AND THEIR POSSIBLE USE AS CONTROLLING AGENTS OF OIL POLLUTION IN THE OCEAN,
Naval Weapons Center, China Lake, Calif. Research Dept.
G. Soli.
Available from NTIS, Springfield, Va. 22151 AD-746 163. Price $3.00 printed copy; $1.45 microfiche. Technical Report No 2, July 1972. 18 p, 2 fig, 4 tab, 4 ref. ONR Task No NR 137-887.

Descriptors: *Oil pollution, *Oily water, *Pollution abatement, *Biodegradation, *Organic compounds, Bacteria, Microorganisms, Chemical reactions, Biological communities, Biochemistry, Data collections, Oil spills, Marine bacteria, Water pollution control, Methodology, Evaluation.

Degradation of petroleum hydrocarbons by marine bacteria is a subject of increasing interest due to the fact that these microorganisms are responsible for the dissimilation of oil which enters natural waters as a contaminant. Attempts were made at characterizing various bacterial strains, isolated from marine environments, on the basis of their ability to attack groups of hydrocarbons, rather than through a conventional bacteriological key. Because hydrocarbons are not always completely oxidized to CO2 and water, but rather degraded to intermediate products such as the corresponding acids or alcohols, a study of the effect of degraded and undegraded crude oil on marine phytoplankton organisms was also initiated. All the bacterial strains investigated demonstrated the ability to digest normal paraffins, with the exception of one strain which attacks preferentially aromatic hydrocarbons. Some of the strains were able to oxidize all three isoparaffins in the mixture, as well as cycloparaffins and aromatics. The results are tabulated. (Woodard-USGS)
W74-02618

ELECTROCHEMICAL FLOTATION CONCEPT FOR REMOVING OIL FROM WATER,
Lockheed Aircraft Service Co., Ontario, Calif.
For primary bibliographic entry see Field 05D.
W74-02634

FEASIBILITY STUDY OF THE SAND SINKING METHOD OF COMBATTING A MAJOR OIL SPILL IN THE OCEAN ENVIRONMENT,
Office of the Chief of Engineers (Army), Washington, D.C.
L. Tobias, L. J. Mauriello, and G. M. Watts.
Available from NTIS as AD-742 949. Final Report prepared for Coast Guard Office of Research and Development, December 1971. 35 p, 13 fig, 1 append. MIPR-Z-70099-9-93403.

Descriptors: *Feasibility studies, *Oil spills, *Pollution sources, Chemical reactions, Oceans, *Water quality control, *Pollution abatement, Environmental effects, *Separation techniques.
Identifiers: *Sand sink method.

The objective was to determine the feasibility of the sand sink method developed by Shell Research in combatting a major oil spill in the ocean environment. The sand sink method sinks floating oil by spraying the oil slick with sand previously made oleophilic by a chemical treatment. The technique contemplates that the sand would be obtained from the sea bottom in the nearshore coastal areas by use of a trailing suction hopper dredge. The dredge with its cargo of sand would then proceed to the site of the oil spill where the sand would be converted to a slurry by the addition of sea water by the dredge pumps. After injection of the chemical into the flowline, the mixture of treated sand would be sprayed over the floating oil by means of a boom and nozzle system extending over the sides of the vessel. The oil wet properties of the treated sand grains would attract the oil in the slick and the oil coated sand grains would sink to the bottom. Laboratory tests were conducted to deter-

mine optimum chemicals and sand to oil ratios for maximum effectiveness for the types of sands existing along the coastal areas of the United States. Different types of oils were investigated as well as different sand gradations to develop the effectiveness parameters. Tables and graphs were developed for different oils, sand ratios and chemical treatment concentrations. Studies were made of the modifications necessary to adapt the Corps Hopper Dredge GOETHALS for a sand sink capability. The investigation suggests that the sand sink method is a feasible technique but its use would depend on consideration of the relative values of environmental factors. (Sinha-OEIS)
W74-02635

INVESTIGATION OF SORBENTS FOR REMOVING OIL SPILLS FROM WATERS,
Naval Ship Research and Development Center, Annapolis, Md.
P. Schatzberg.
Available from NTIS as AD-742 950. Final Report No. 724110.1/2/1, prepared for Coast Guard Office of Research and Development, November 1971. 48 p, 15 fig, 20 tab, 14 ref, 11 append. MIPR-Z-70099-0-00584.

Descriptors: *Oil spills, Separation techniques, *Pollution sources, *Pollution abatement, Water quality control.
Identifiers: Polymeric hydrocarbon, Polymeric foam, Water pollution prevention, *Sorbents, Petroleum products.

Laboratory methods have been developed to evaluate floating sorbent materials for removing oil spilled on water. These methods were applied to 49 different sorbent materials belonging to five categories: inorganic, natural organic, polymeric foam, polymeric hydrocarbon, and miscellaneous products. Some of the properties evaluated were oil and water sorption capacity, oil retention, buoyancy retention with and without absorbed oil, effect of petroleum product variation, sorbent/oil coherence, and reusability. Of all the materials evaluated the polymeric foam and the polymeric hydrocarbon products showed the best overall properties for removing oil spilled on water. Of these two groups, the resilient polyurethane foams and the polypropylene fibers were the best materials. The inorganic, the natural organic, and the miscellaneous products showed a relatively low capacity for oil and a relatively poor buoyancy retention. (Sinha-OEIS)
W74-02636

INSECT PEST MANAGEMENT IN COASTAL AND ESTUARINE HABITATS,
North Carolina State Univ., Raleigh. Dept. of Entomology.
R. C. Axtell, and K. L. Knight.
Available from NTIS as COM-72-10453. Sea Grant Publication, Progress Report, December 1971. 56 p, 3 fig, 3 tab. SG 2-35178 and ES00069.

Descriptors: *Insects, Coasts, Estuaries, Diseases, Mosquitoes, Environmental effects, *Aquatic insects, *Pollution abatement, *North Carolina, Insect control, *Marsh management, *Marsh plants, Aquatic habitats, Ecosystems.
Identifiers: Flies, Tabanidae, Juncus, Spartina, *Pest management.

Areas of Carteret Co., North Carolina are being used as a model to develop the data required for a pest management program in a coastal and estuarine situation. Initially it is necessary to determine: (1) What species of pests are present. (2) Which ones are of economic importance. (3) Where do they breed. and (4) What factors regulate their abundance. Research has been in progress (1970-71) on two phases; the populations and breeding habitats of biting flies (Tabanidae), and the effect of ditching Juncus marsh on the production of mosquitoes. (Sinha-OEIS)
W74-02643

06. WATER RESOURCES PLANNING

6A. Techniques of Planning

MUNICIPAL WATER PLANNING--MIXED INTEGER APPROACH,
Utah State Univ., Logan. Dept. of Civil Engineering.
For primary bibliographic entry see Field 03D.
W74-02223

HYDROLOGIC AND WATERSHED MODELING FOR WATERSHED PLANNING,
Soil Conservation Service, Portland, Oreg.
For primary bibliographic entry see Field 04D.
W74-02224

HYDROLOGIC SIMULATION MODEL OF COLORADO SUBALPINE FOREST,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 07B.
W74-02248

SYSTEMS ANALYSIS OF IRRIGATION WATER MANAGEMENT IN EASTERN IDAHO,
Idaho Univ., Moscow. Water Resources Research Inst.
For primary bibliographic entry see Field 04B.
W74-02322

USE OF SYSTEMS APPROACHES IN PLANNING ISRAEL'S WATER RESOURCES MANAGEMENT,
Tahal Consulting Engineers Ltd. (Tel Aviv, Israel).
M. Gablinger, J. Schwarz, and Y. Vardi.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 38 p, 6 tab, 2 fig.

Descriptors: *Water resources, *Regional analysis, *Model studies, Management, Water transfer, Water requirements, Regional development, Water allocation (Policy), Water resources development, Aquifers, Economic impact, Demand, Water demand, Computer models, Statistical models.
Identifiers: *Israel.

The historical, legal, and physical background to Israel's water problems is presented. The principal water resource supply characteristics are identified as large supplies of water in the country's main aquifers, and relatively high seasonal and variable rainfall. Demand, on the other hand, is characterized by a high agricultural use which cannot be significantly reduced in the foreseeable future, in spite of the steadily growing domestic and industrial requirements. A resource management policy is therefore desired to postpone recourse to costly large-scale sea water desalination, indicate ways of using part of the water accumulated in the aquifers while minimizing the danger of irreversible degradation of aquifers, and minimize curtailment in agricultural allocations. At present a series of interacting resources management models is being developed to devise appropriate operational and development patterns. Some of these models, using linear programming and statistical techniques, are outlined. A hierarchy of such models is established in which outputs of more general models serve as inputs for more detailed ones. Sensitivity analyses serve as indicators for information aquisition policies. (Muller-Arizona)
W74-02352

A BAYESIAN DECISION FRAMEWORK FOR SYNTHETIC HYDROLOGY,
IBM Watson Research Center, Yorktown Heights, N.Y.
J. R. Wallis, and P. E. O'Connell.
Available from the National Technical Information Service as PB-226 289 $3.00 in paper copy, $1.45 in microfiche. Completion Report, July 1973. 44 p, 29 ref. OWRR C-4094 (no 9019) (1).

Descriptors: Simulation analysis, Stochastic Processes, Optimization, *Risks, Statistical methods, Synthetic hydrology, *Longterm planning, Decision making.
Identifiers: Operational hydrology, *Monte Carlo methods, *Bayes Theorem, *Decision Theory.

Given that the large uncertainity in the amount of persistence that should be incorporated into synthetic hydrology it is believed that a Bayes risk decision theoretic approach would be the optimal strategy for water resource system designers. A methodology and example of use for this concept are given.
W74-02438

DEVELOPMENT OF MODELS FOR ANALYZING WATER RESOURCES DEVELOPMENT AND USE WITHIN A REGIONAL FRAMEWORK,
Iowa State Univ., Ames.
J. F. Timmons, and J. R. Prescott.
Available from the National Technical Information Service as PB-226 296, $5.25 in paper copy, $1.45 in microfiche. Completion report, ISWRRI-55, Iowa State Water Resources Research Institute, Iowa State University, Ames, Iowa, June 1973. 209 p, 3 fig, 5 tab, 115 ref. OWRR B-015-IA (6).

Descriptors: *Mathematical models, *Water resources development, *Regional analysis, *Economic impact, *Simulation analysis, *Linear programming, Optimization, Planning, Evaluation, Costs, Pricing, Research, Abstracts, Bibliographies, Systems analysis, *Water utilization.
Identifiers: Contiguous water basins.

Reported are the research accomplishments of a project with the following objectives: (1) construction of mathematical models emphasizing (a) integration of the water sector within regional models and (b) the combination of regional models in simulating the impacts of economic development on water uses; (2) incorporation of spatial and temporal dimensions within the above-mentioned models, and the evaluation of effects and costs of alternative institutional and pricing policies to seek a more equitable incidence of water uses; and (3) application of models emphasizing water used within and among contiguous water basins with particular reference to spatial aspects of regional water planning. The journal articles, book chapters, proceedings papers, and dissertations belonging to this research effort are listed. The completed articles, chapters and papers (numbering 6), and detailed summaries of the dissertations (numbering 5) are provided in this volume's appendix; preceding this is a brief section summarizing the models directly pertinent to the aforementioned objectives and the papers dealing with problems of regional modeling influencing the work conducted under the research grant. The modeling techniques considered are primarily simulation and linear programming optimization. (Bell-Cornell)
W74-02455

6B. Evaluation Process

A SUMMARY ANALYSIS OF NINETEEN TESTS OF PROPOSED EVALUATION PROCEDURES

ON SELECTED WATER AND LAND RESOURCE PROJECTS.
Water Resources Council, Washington, D.C.

Report to the Water Resources Council by the Special Task Force, July 1970. 201 p, 13 tab.

Descriptors: *Testing, *Methodology, Water resources development, *Multiple-purpose projects, Analytical techniques, *Evaluation, Research and development, Measurement, Projects, Testing procedures, *Standards, Performance, Variability, Planning, Economic efficiency, Economic justification, *Estimated benefits, *Estimated costs.

A series of tests was instituted by the Water Resources Council in 1969 on several types of water resources projects to determine whether in evaluating the measurement and effects in terms of benefits and costs, and in the formulation of alternative plans, different teams can accomplish appropriate results and achieve reasonably uniform comparability in application. The test results substantiated that the 1969 report was concerned primarily with concepts and included only a few standards and procedures to implement them. Much of that testing effort was directed toward the development of standards and procedures to implement the concepts. The tests indicate that the multiobjective approach to planning is practical. Meaningful results can be accomplished and reasonably uniform comparability in application can be achieved by establishing carefully structured principles, standards, and procedures. The report contains the test procedures used, an analysis of the test results, and an analysis of the methodology and procedure used in the tests. (Mockler-Florida)
W74-02188

AN ECOLOGICAL EVALUATION OF STREAM EUTROPHICATION,
Michigan State Univ., East Lansing. Inst. of Water Research.
For primary bibliographic entry see Field 05C.
W74-02201

USER RELATED STUDY OF THREE MICHIGAN RIVERS,
Michigan State Univ., East Lansing. Dept. of Park and Recreation Resources.
L. W. Moncrief.
Available from NTIS as PB-226 067 $3.75 in paper copy, $1.45 in microfiche. OWRR C-3381 (No 3723) (10). Supplement A of Project Completion Report, July 1973. 78 p.

Descriptors: *Recreation, Recreation demand, *Attitudes, *Michigan, Social aspects, *Water utilization.
Identifiers: *User related study.

Recreational use, user characteristics, and user perceptions were measured on three rivers in Michigan: the Red Cedar, the Au Sable and the Jordan Rivers. The data were gathered by means of a mailed questionnaire, using a population sample obtained on-site at the three rivers. The majority of users on all three rivers had not participated in any recreational activity at 'their' river more than one to four times during the calendar year preceding the time they answered the questionnaire. This study investigates the recreational behavior of the users of three distinct types of recreational rivers. This research should give some idea of the effect of location, latent and ongoing recreation activity opportunities, use conditions and general environmental conditions on behavior and perceptions. Reasons for using a river are complex and not well understood. It would appear that the nearness of the user to a stream may serve as a deterrent to its use for recreation. The questions on both questionnaires, user and non-user, are grouped in an effort to determine certain overall perceptions and attitudes of the respondents. In addition, there are questions to determine uses of the rivers, user perceptions of management and the socio-economic background of the respondents. (See also W74-02201)
W74-02202

ECONOMIC EVALUATION OF THE SPORT FISHERY OF THE AU SABLE RIVER, MICHIGAN,
Michigan State Univ., East Lansing. Dept. of Park and Recreation Resources.
J. W. Pearce, and L. W. Moncrief.
Available from NTIS as PB-226 111 $3.75 in paper copy, $1.45 in microfiche. OWRR C-3381 (43723) (11). Supplement B of a Project Completion Report, July 1973. 65 p.

Descriptors: Economics demand, Natural resources, Management, *Sport fishing, *Michigan, Economic impact, *Cost analysis, Recreation, Input-output analysis, Water utilization, Decision making.
Identifiers: *Au Sable River (Mich), Clawson's method, *Sport fishing.

The Au Sable River sportfishing resource was subjected to a three-phase economic demand analysis utilizing existing statewide fishery survey data collected during 1970 and 1971. Confidence in the applicable data extracted for this analysis is limited; hence, the results drawn from it should be viewed with caution. The best estimate of the economic value to the State of Michigan as a result of resident (state residents) sportfishing on the Au Sable was $536,640 in 1970. Since economic information was not requested of fishermen surveyed in 1971, expenditure data from the 1970 analysis were extrapolated to the angling pressure (angler days) reported during 1971. This gave an estimated overall economic value for the resource of $838,290 in 1971. Natural resources management decisions are becoming increasingly subject to a more explicit definition of costs and benefits. The competition for the use of scarce natural resources, in conjunction with the advent of cost-benefit and cost-effective analyses, places an urgent requirement upon management to more clearly specify program outputs in terms of their (dollar) value to people. The practical application of economic demand analysis in a non-market setting commends itself to finding a solution to many natural resources management problems. (See also W74-02201)
W74-02203

THE DEMAND FOR AND VALUE OF THE SPORT FISHERY ON THE AU SABLE, JORDAN, AND RED CEDAR RIVERS,
Michigan State Univ., East Lansing. Dept. of Park and Recreation Resources.
J. W. Pearce, and L. W. Moncrief.
Available from NTIS as PB-226 114 $3.00 in paper copy, $1.45 in microfiche. OWRR C-3381 (No 3723) (12). Supplement C of Project Completion Report, July 1973. 26 p.

Descriptors: Economics, Sport fishing, Economic impact, *Demand, *Recreation demand, *Evaluation, *Michigan.
Identifiers: Clawson's method, Angler day value, *Sport fishery.

Demand curves for sport fishing on the Au Sable, and Jordan Rivers of Michigan are presented. Data were insufficient to estimate a curve for the Red Cedar. The best estimate of the demand curve for the entire recreation experience using the Au Sable River for sport fishing is $y \pm 361.0012 - 318.8405 \log x$; for the Jordan, $\log y \pm 5.2312 - 4.2571 \log x$. Demand curves for the use of the sport fishery are derived from these curves. The value of the sport fishery is defined as the area under the demand curve for the resource alone which represents the aggregate willingness to pay for use of the resource for sport fishing. The value of the sport fishing on the Au Sable is estimated at $536,000 in 1970 and $846,000 in 1971. The Jordan sport fishery is valued at $17,000 in 1970 and $53,000 in 1971. Demand curves were estimated using the technique suggested by Marion Clawson. The data used were collected in statewide surveys of licensed anglers conducted by the Michigan Department of Natural Resources in 1970 and 1971. (See also W74-02201)
W74-02204

THE EX POST MEASUREMENT OF BENEFITS AND COSTS IN SMALL WATERSHED PROJECTS,
Georgia Univ., Athens. Inst. of Natural Resources.
P. A. Maxwell.
Available from the National Technical Information Service as PB-226 108, $9.50 in paper copy, $1.45 in microfiche. Doctoral Dissertation, May 1973. 136 p, 14 fig, 12 tab, 55 ref, 2 append. OWRR B-059-GA (1). 14-31-0001-3570.

Descriptors: *Evaluation, *Project feasibility, Project planning, River basin development, Water control, Alternative costs, *Benefits, Costs, Recreation, Flood control, Water supply, Social aspects, *Economic feasibility, *Small watersheds, *Cost-benefits analysis.

Methods available to measure the performance of public investment are developed and tested with specific attention to water resources projects for flood control, municipal and industrial water supply, and recreation. The use of 'with-without' analysis in all measurements is recommended, and a distinction is made between direct measurement techniques and indirect measurement techniques. The direct measurements attempt to measure variables showing the net benefits from each project purpose while the indirect techniques measure the growth of surrogate variables which reflect the impact of an entire project. The research uses these methods to measure the ex post performance of two PL 566 small watershed projects in Georgia, Rooty Creek and the Little Tallapoosa River. By observing the growth of income in analogue undeveloped watersheds the conclusion is reached that neither project should have been built. Sources of the discrepancies between ex ante and ex post estimates of costs and benefits from these projects are discussed, and suggestions are made on ways to improve future agency benefit-cost analyses.
W74-02212

OPTIMUM DESIGN PERIOD FOR WATER POLLUTION CONTROL PLANTS,
For primary bibliographic entry see Field 05D.
W74-02222

COST EFFECTIVENESS OF CURRENT ENVIRONMENTAL ENGINEERING PRACTICES,
Camp, Dresser and McKee, Boston, Mass.
For primary bibliographic entry see Field 05D.
W74-02225

INTERBASIN TRANSFER OR MIGRATION: AN ECONOMIC ANALYSIS OF TWO RESPONSES TO GROUND WATER DEPLETION,
Kansas Water Resources Research Inst., Manhattan.
For primary bibliographic entry see Field 04B.
W74-02323

A GUIDE TO IMPORTANT CHARACTERISTICS AND VALUES OF FRESHWATER WETLANDS IN THE NORTHEAST.
Massachusetts Univ., Amherst. Dept. of Forestry and Wildlife Management.
For primary bibliographic entry see Field 04B.
W74-02324

CITY OF AUSTIN, TEXAS, STUDY OF WASTEWATER COLLECTION SYSTEM: PHASE I.
Horner and Shifrin, Inc., St. Louis, Mo.
For primary bibliographic entry see Field 05D.
W74-02330

METROPOLITAN WATER AND SEWER PLAN, LUBBOCK METROPOLITAN COUNCIL OF GOVERNMENTS.
Hudgins, Thompson, Ball and Associates, Inc., Lubbock, Tex.
For primary bibliographic entry see Field 03D.
W74-02331

TOMBIGBEE RIVER VALLEY WATER MANAGEMENT DISTRICT, TENTH ANNUAL REPORT.
Tombigbee River Valley Water Management District, Tupelo, Miss.

April 1973. 56 p, 10 fig.

Descriptors: *Planning, *Administration, *Water resources development, *Projects, Project purposes, *Mississippi, Conservation, Regional development, Natural resources.
Identifiers: *Tombigbee River (Mississippi).

The Tombigbee River Valley Water Management District was created by the Mississippi legislature in 1962 to provide for the development of various aspects of the Tombigbee River Basin. There are 12 member counties in the District and 3 counties are eligible to become members of the District. The District is funded by local ad valorem taxes. The main objective of the District is to cooperate with and assist every local state, and federal organization that has some responsibility for the conservation and development of the natural resources of the area. Other specific objectives include: (1) assist in the implementation of the Corps of Engineers' Tennessee-Tombigbee Waterway Project, (2) sponsor the implementation of the Corps' flood control project on the Tombigbee River and tributaries, (3) assist in the Corps' study of the Tombigbee River Basin, (4) sponsor the federal water resources planning act in the District, (5) provide public parks and recreation facilities within the District, and (6) cooperate with the State Air and Water Pollution Commission in providing the area with clean and plentiful water. The activities of the previous year are outlined and described briefly. (Poertner)
W74-02332

A WATER AND SEWER PLAN: GREENE COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.
For primary bibliographic entry see Field 05D.
W74-02334

A WATER AND SEWER PLAN: MORGAN COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.
For primary bibliographic entry see Field 05D.
W74-02335

A WATER AND SEWER PLAN: MADISON COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.
For primary bibliographic entry see Field 05D.
W74-02336

A WATER AND SEWER PLAN: WALTON COUNTY, GEORGIA.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.
For primary bibliographic entry see Field 05D.
W74-02337

REGIONAL WASTEWATER FACILITIES STUDY.
Anderson-Nichols and Co., Inc., Concord, N.H.
For primary bibliographic entry see Field 05D.
W74-02338

NORTHEAST GEORGIA AREA WATER AND SEWER SYSTEMS PLAN AND CAPITAL IMPROVEMENT PROGRAM.
Mayes, Sudderth and Etheredge, Inc., Atlanta, Ga.
For primary bibliographic entry see Field 03D.
W74-02339

THE BALANCE OF SURFACE WATER RESOURCES IN THE LOWER MESOPOTAMIAN VALLEY,
Research Inst. for Water Resources Development, Budapest (Hungary).
G. Kienitz.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 29 p, 6 tab, 2 fig, 6 ref.

Descriptors: *Water resources development, *Planning, Water requirements, Water management (Applied), Water demand, Water utilization, Irrigation, River basin development, Water supply development, River flow, Management.
Identifiers: *Iraq (Lower Mesopotamian Valley).

Experiences and views concerning the water resources development of the Lower Mesopotamian Valley, based on work with UNESCO in the area in 1971, are presented. Since the inception of active water resources development in the 1930's, Iraq has come far in the fields of data aquisition, planning and supply development. Projected development, however, was not yet evaluated in a comprehensive balance of available water resources with demands. In reviewing work toward estimating steps needed for such a balance, both the present situation and the one to be expected after the realization of prospective reservoirs and irrigation projects are detailed. The cumulative value of water resources as well as of demands were plotted in the way of longitudinal profiles progressing along rivers in a downstream direction. Results show a sharp shortage of water due to extreme specific irrigation water demands, both present and future, and point toward the necessity of detailed investigations of water management practices and balancing in this area. (Muller-Arizona)
W74-02350

EVOLVING WATER POLICY AND MANAGEMENT IN THE UNITED STATES,
Bureau of Reclamation, Washington, D.C.
W. D. Fairchild.
In: Papers, International Symposium on Water Resources Planning, Mexico City, Mexico Volume III, December 1972, 19 p.

Descriptors: *Planning, *Water management (Applied), *Water allocation (Policy), *Regional development, Water resources development, Optimum development, *Multiple purpose, Water supply development, Water quality control, Flow augmentation, Geothermal studies, Colorado River Basin, Reclamation states, National water commission, Water law, Environmental effects.

In recent years the philosophy behind water resources planning in the U.S. has been altered by changing public goals and values from a single-purpose, single-project approach to one of multiple-purpose and comprehensive regional planning. The Bureau of Reclamation has developed procedures to apply the new 'Principles and Standards for Planning Water and Land Resources' that have been proposed by the Water Resources Council, and which convey this new philosophy. These procedures are in use in the Bureau's 11-state Western U. S. Water Plan to develop comprehensive reconnaissance plans to meet the needs of the region involved and will study the feasibility of augmenting the water supply of the Colorado River by weather modification, desalting, geothermal development, and water reuse. Changing priorities of water use give greater emphasis to the purpose of municipal and industrial water, recreation, and enhancement of fish and wildlife resources. The importance of water quality is taking its place along with water quantity. Efficiency of planned systems is considered now, as well as the environmental impact of such systems. (Muller-Arizona)
W74-02358

EVALUATION OF THE REGIONAL MULTIPURPOSE ECONOMIC BENEFITS RESULTING FROM A WATER AND RELATED LAND RESOURCE DEVELOPMENT,
Idaho Univ., Moscow. Water Resources Research Inst.
K. H. Lindeborg.
Available from the National Technical Information Service as PB-226 261 $3.00 in paper copy, $1.45 in microfiche. Technical Completion Research Report, Sept. 1973, 38 p. 3 fig, 6 tab, 2 ref. OWRR C-2195 (no 3384) (1).

Descriptors: *Water resources development, *Irrigation programs, *Land development, *Multipurpose projects, *Economic feasibility, Cost-benefit analysis, Recreation, *Idaho, Model studies, Evaluation.
Identifiers: Mountain Home (Ida.).

A study area in southwest Idaho, Mountain Home, was selected for a multi-disciplinary project to determine the optimum multi-purpose development of water resources in the area. This report, one of several, focuses on two functions, irrigation and recreation, of the overall Bureau of Reclamation plan designed to meet the present and foreseeable future water needs of the area. An effort was made to conceptualize the development of the area by developing a model to measure the impact of water projects thereon, including economic benefits, though this objective was not completely realized. Sufficient data were gathered, however, to show a trend toward large development of private farms from desert land, and sales of state land for agricultural purposes. A 15 percent increase in irrigated acreage over 1909 figures is shown, with irrigation water for these new farms coming from groundwater sources and some high-lift pumping from the Snake River. Some sprinkler irrigation units are now in use. Attention is given to costs associated with increased irrigation, notably power needs. Brief mention is made of recreation possibilities, particularly pheasant hunting. (Paylore-Arizona)
W74-02439

DEVELOPMENT OF MODELS FOR ANALYZING WATER RESOURCES DEVELOPMENT AND USE WITHIN A REGIONAL FRAMEWORK,
Iowa State Univ., Ames.
For primary bibliographic entry see Field 06A.
W74-02455

STATE WATER PLAN, PROCEEDINGS OF 18TH ANNUAL NEW MEXICO WATER CONFERENCE.

Available from the National Technical Information Service as PB-226 288, $6.75 in paper copy, $1.45 in microfiche. Conference held April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, July 1973. 83 p. OWRR A-999-N Mex (10).

Descriptors: *Water resources development, *New Mexico, *Conferences, *Information exchange, Reviews, Documentation, Water de-

mand, Water utilization, Economics, Social aspects, Surface waters, Groundwater, Environmental control, Ecology, Water quality control, Water pollution control, National Water Commission, *Planning.

The Eighteenth Annual New Mexico Water Conference was held at the New Mexico State University on April 5-6 for the purpose of exchanging information pertaining to water resources. The papers are reproduced in the same form as that in which they were received and include: State Water Plan, by S. E. Reynolds; Population Projections for the New Mexico State Water Plan, by Lee. B. Zink; A Study of Water Used on Urban Landscapes, by Fabian Chavez III and Donald J. Cotter; Uptake of Mercury by Fish in Natural and Artificial Systems, by Don H. Baker III, Carl J. Popp, and Donald K. Brandvold; Another Rio Grande for New Mexico, by L. P. Reinig, R. I. Brasier, B. J. Donham, and W. S. Gregory; Clean Energy via Coal Gasification, by A. J. Paquette and M. R. Beychock; and Report by the National Water Commission: A Review, by Harry P. Burleigh. (See W74-02457 thru W74-02463) (Woodard-USGS)
W74-02456

STATE WATER PLAN,
S. E. Reynolds.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, p 10-18, July 1973.

Descriptors: *Water resources development, *Water Resources Planning Act, *New Mexico, Federal government, State governments, Reviews, Projects, Water rights, Legal aspects, Water utilization, Irrigation, Water supply, Surface waters, Groundwater, Water importing.
Identifiers: *State water plan (N Mex).

One of the major functions of the Interstate Stream Commission is to review and comment on plans for federal water projects in New Mexico and on interstate streams in other states to make sure that New Mexico's interests are protected. This work includes cooperation in and coordination of the work of federal agencies in planning projects in New Mexico. The Commission has participated in the formulation of project plans, operating criteria, and authorizing legislation for many federal projects, including the Navajo Dam and Reservoir Project and related Navajo Indian Irrigation Project on the San Juan River, the San Juan-Chama Diversion Project, the Animas-La Plata Project on the Animas River in Colorado and New Mexico, and the Hooker Unit of the Central Arizona Project, all Bureau of Reclamation Projects and the Corps of Engineers Cochiti and Galisteo Reservoir Projects. There is underway a study of the practicability of bringing surplus water from the Mississippi River system to West Texas and Eastern New Mexico to sustain the irrigation economy based on groundwater mining. Many other projects and plans are discussed. (See also W74-02456) (Woodard-USGS)
W74-02457

POPULATION PROJECTSIONS FOR THE NEW MEXICO STATE WATER PLAN,
New Mexico Univ., Albuquerque. Bureau of Business Research.
L. B. Zink.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, p 19-29, July 1973. 1 tab, 1 ref.

Descriptors: *Water resources development, *Water demand, *Projections, *Human population, *New Mexico, Estimating, Forecasting, Water utilization, Reviews, Evaluation.
Identifiers: *State water plan (N Mex).

The projections of population, employment, and income formulated as guides for water-use planning in New Mexico are the work of two separate organizations and numerous researchers. The basic philosophy underlying these projections is that the size of New Mexico's population in the forseeable future will be determined by the size of the State's employment, by the nature of its resources, and by the character of the utilization of those resources. Employment is the major determinant of population size. The assumption is that all counties in New Mexico will have greater populations in 1980 than in 1970. That is, all New Mexico counties are assumed to have already reached their lowest population level. The highest estimated population for the State in the year 2020 is 4,621,400. (See also W74-02456) (Woodard-USGS)
W74-02458

A STUDY OF WATER USED ON URBAN LANDSCAPES,
New Mexico State Univ., University Park. Dept. of Horticulture.
F. Chavez, III, and D. J. Cotter.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, p 30-39, July 1973. 4 fig, 8 ref.

Descriptors: *Water utilization, *Lawns, *Urbanization, *Landscaping, *New Mexico, Sprinkler irrigation, Cities, Surveys, Rates of application, Water loss, Soil types.
Identifiers: *Urban landscapes, Lawn watering.

A study conducted to determine the water used by urban home owners in Las Cruces, New Mexico, to maintain their landscapes showed that from 40% to 65% of private metered water was used for maintaining plants in the landscape. The water quantity used was in proportion to living mesic plants. Homeowners with 90% to 100% of the space devoted to living plants applied 99% more water per home than landscapes characterized as intermediate, where living plants were maintained on only 50% to 70% of the space. A highly significant correlation coefficient of 0.738 was obtained between landscape water use and landscape size. However, approximately 38% of the average amount of water utilized for landscape irrigation is in excess of estimated optimum amounts. Renewed emphasis on education programs directed toward an attempt to encourage wise water usage is urgently needed. (See also W74-02456) (Woodard-USGS)
W74-02459

UPTAKE OF MERCURY BY FISH IN NATURAL AND ARTIFICIAL SYSTEMS,
New Mexico Inst. of Mining and Technology, Socorro. Dept. of Biochemistry.
For primary bibliographic entry see Field 05B.
W74-02460

ANOTHER RIO GRANDE FOR NEW MEXICO,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 03A.
W74-02461

'CLEAN ENERGY VIA COAL GASIFICATION',
Fluor Corp. Ltd., Los Angeles, Calif.
A. J. Paquette, and M. R. Beychock.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Report No 026, p 62-77, July 1973. 4 fig, 3 tab.

Descriptors: *Coals, *Gases, *Energy conversion, *Natural gas, *New Mexico, Methodology, Pilot plants, Water requirements.
Identifiers: *Coal gasification, Lurgi coal gasification process.

The commercial gasification of coal has been practiced for at least 50 years. A natural gas shortage plus the emphasis on removal of sulfur from fuels, has accelerated the search for new sources of Substitute Natural Gas and new supplies of Liquefied Natural Gas. The Lurgi gasification process will be used in the recently announced New Mexico coal gasification project. The Lurgi pressure coal gasification process, which was developed in 1930, has proven, large-scale commercial experience. Since 1936, the Lurgi process has been used commercially in many parts of the world, including Germany, Scotland, South Africa, and Korea. (See also W74-02456) (Woodard-USGS)
W74-02462

REPORT BY THE NATIONAL WATER COMMISSION--A REVIEW,
Texas Water Development Board, Austin.
H. P. Burleigh.
In: State Water Plan, Proceedings of 18th Annual New Mexico Water Conference, April 5-6, 1973, Las Cruces: New Mexico State University Water Resources Research Institute Report No 026, p 78-83, July 1973.

Descriptors: *Water resources development, *National Water Commission, *Reviews, Water demand, Water utilization, Environmental control, Ecology, Water quality control, Water pollution control, Planning, Projections, Economics, Social aspects.

The duties of the National Water Commission as set forth in Public Law 90-515, 90th Congress, S. 20, September 26, 1968, covered a range of water subjects from a review of present and anticipated national water resources problems to a consideration of economic and social consequences of water resource development and allocation. Its task was rendered difficult because the Nation is undergoing a period of rapid change in social and environmental preferences, and these preferences have a direct bearing upon the Commission's view of its mission to determine 'what policies the Nation should adopt to ensure that its finite water resources are used in ways which yield the highest measure of welfare to society, now and in the future.' In carrying forward its work, and in the conclusions incorporated in the Review Draft of the Commission's Proposed Report, the Commission has made valuable contributions to the solution of some of the perplexing resource management problems of the Nation, and has addressed some long-needed institutional changes to reflect its view of the proper governmental posture in the light of present conditions. Particularly significant findings by the Commission are presented in this review. (See also W74-02456) (Woodard-USGS)
W74-02463

GUIDELINES FOR THE COASTAL ZONE.
Coastal Plains Center for Marine Development Services, Wilmington, N.C.
For primary bibliographic entry see Field 02L.
W74-02510

APPLICATIONS OF MULTISPECTRAL IMAGERY TO WATER RESOURCES DEVELOPMENT PLANNING IN THE LOWER MEKONG BASIN (KHEMER REPUBLIC, LAOS, THAILAND AND VIET-NAM),
Economic Commission for Asia and the Far East (UN), Bangkok (Thailand). Mekong Committee Secretariat.
For primary bibliographic entry see Field 07B.
W74-02590

6C. Cost Allocation, Cost Sharing, Pricing/Repayment

COST EFFECTIVENESS IN POLLUTION CONTROL--TREATMENT OF GLUE FACTORY WASTES BY CARBON ADSORPTION SYSTEM,
Calspan Corp., Buffalo, N.Y.
For primary bibliographic entry see Field 05D.
W74-02177

WATER AND SEWERAGE IMPROVEMENTS NEEDED IN 1975 IN CHATHAM COUNTY, GEORGIA.
Chatham County-Savannah Metropolitan Planning Commission, Savannah, Ga.
For primary bibliographic entry see Field 05D.
W74-02186

FINANCING PRIVATE WATER RESOURCE DEVELOPMENT: ANALYSIS OF A STATE LOAN PROGRAM,
Wyoming Univ., Laramie. Div. of Agricultural Economics.
For primary bibliographic entry see Field 03F.
W74-02221

ECONOMIC ASPECTS OF ENVIRONMENTAL PROTECTION (IN GERMAN),
For primary bibliographic entry see Field 05G.
W74-02227

ION EXCHANGE AND ALLIED PROCESSES IN WATER RECOVERY,
Permutit Co. Ltd., London (England).
For primary bibliographic entry see Field 05D.
W74-02268

IN-PIPE WASTEWATER CLEANUP.
For primary bibliographic entry see Field 05D.
W74-02269

FLOOD CONTROL FUNDS -- 1970 REPORT TO THE LEGISLATURE.
California State Dept. of Water Resources, Sacramento.

Bulletin No 158-70, January 1971. 7 p, 3 tab.

Descriptors: *Flood control, *Projects, *Expenditures, California, *Costs, Documentation, Flood protection, Right-of-way, Relocation, Engineering structures.
Identifiers: *California Water Code, Flood control project funds.

Expenditure of state flood-control funds are reported for California from January 1 through December 31, 1970, by the Department of Water Resources and The Reclamation Board. The California Water Code requires that expenditure of such funds be reported by the 15th day of each regular session of the State Legislature. Expenditures made during the year for projects under the juridiction of the Department and the Board are presented separately. During 1970 the Department issued reallocation orders in a net amount of $5,803,907.94. Expenditures by the Department since its program's inception in 1946 total $122,380,000. The Reclamation Board expended $3,199,557 in 1970. Expenditures by the Board since its program began in 1917 total $99,295,385. (Woodard-USGS)
W74-02292

THE IMPACT OF WATER POLLUTION ABATEMENT ON COMPETITION AND PRICING IN THE ALABAMA STEEL INDUSTRY,
Auburn Univ., Ala. Water Resources Research Inst.
For primary bibliographic entry see Field 05D.
W74-02437

THE PROBLEMS AND ISSUES OF IMPLEMENTING THE FEDERAL WATER PROJECT RECREATION ACT IN THE PACIFIC NORTHWEST,
Oregon State Univ., Corvallis. Dept. of Geography.
K. W. Muckleston.
Available from the National Technical Information Service as PB-226 295, $4.50 in paper copy, $1.45 in microfiche. Oregon State University Water Resources Research Institute Completion Report WRRI-20, October 1973. 136 p, 10 fig, 16 tab, 56 ref, 2 append. OWRR B-025-ORE (1) 14-31-0001-3632.

Descriptors: *Cost sharing, *Federal-state cooperation, *Recreation, *Fish management, Political aspects, Reservoir operation, Water resource development.
Identifiers: Pacific Northwest, Washington, Oregon.

The research assesses the implementation of the Federal Water Project Recreation Act in the Pacific Northwest in particular and in the U.S. in general. By passage of the Act Congress sought to (1) place the Bureau of Reclamation and Corps of Engineers on equal ground re the provision of recreation; (2) ensure that recreation and fish and wildlife became coequals with traditional project purposes; and (3) devolve upon nonfederal entities more financial and planning responsibilities for the enhancement of recreation and fish and wildlife. Implementation of the Act is halting and uneven at best. Implementation is more difficult in the Pacific Northwest than in the rest of the U.S. Although the protracted project gestation period and relative recency of the Act preclude firm conclusions, trends are apparent: It was unrealistic for Congress to expect the Act to accomplish the three goals given the water development system in which PL 89-72 operates. In general federal agencies have been slow to relinquish planning prerogatives to the nonfederal entities, who in turn have been hesitant to cost-share what was once free. Moreover, many nonfederal entities do not have the planning expertise to make meaningful planning inputs. Recreation and fish and wildlife have not attained coequality among project purposes; and the Corps continues to retain the advantage vis-a-vis the Bureau of Reclamation in the provision of recreation. Some of the variables that appear to influence the nonfederal decision to cost-share are: the relative expense of participation, spatial priorities, philosophy of cost-sharing, importance of withholding PL 89-72 functions from the project b/c ratio, extraordinary sources of funds, receptivity to post-industrial values, constitutional limitations on indebtedness, attitude towards charging user fees.
W74-02453

6D. Water Demand

ECONOMIC EVALUATION OF THE SPORT FISHERY OF THE AU SABLE RIVER, MICHIGAN,
Michigan State Univ., East Lansing. Dept. of Park and Recreation Resources.
For primary bibliographic entry see Field 06B.
W74-02203

THE DEMAND FOR AND VALUE OF THE SPORT FISHERY ON THE AU SABLE, JORDAN, AND RED CEDAR RIVERS,
Michigan State Univ., East Lansing. Dept. of Park and Recreation Resources.
For primary bibliographic entry see Field 06B.
W74-02204

MUNICIPAL WATER PLANNING--MIXED INTEGER APPROACH,
Utah State Univ., Logan. Dept. of Civil Engineering.
For primary bibliographic entry see Field 03D.
W74-02223

WASTE WATER RESEARCH FOR THE PULP AND PAPER INDUSTRY AT THE DARMSTADT TECHNOLOGICAL INSTITUTE (ABWASSERFORSCHUNG FUER DIE PAPIER-UND ZELLSTOFFINDUSTRIE AN DER TH DARMSTADT),
Technische Universitaet, Darmstadt (West Germany). Wasser- und Abwasserforschungsstelle.
For primary bibliographic entry see Field 05D.
W74-02257

WATER RESOURCES OF LEE COUNTY, MISSISSIPPI,
Geological Survey, Washington, D.C.
For primary bibliographic entry see Field 04B.
W74-02340

THE BALANCE OF SURFACE WATER RESOURCES IN THE LOWER MESOPOTAMIAN VALLEY,
Research Inst. for Water Resources Development, Budapest (Hungary).
For primary bibliographic entry see Field 06B.
W74-02350

POPULATION PROJECTSIONS FOR THE NEW MEXICO STATE WATER PLAN,
New Mexico Univ., Albuquerque. Bureau of Business Research.
For primary bibliographic entry see Field 06B.
W74-02458

6E. Water Law and Institutions

APPROACHES TO STATE COASTAL MANAGEMENT,
Rhode Island Univ., Kingston. Coastal Resources Center.
For primary bibliographic entry see Field 02L.
W74-02185

TOMBIGBEE RIVER VALLEY WATER MANAGEMENT DISTRICT, TENTH ANNUAL REPORT.
Tombigbee River Valley Water Management District, Tupelo, Miss.
For primary bibliographic entry see Field 06B.
W74-02332

GROUNDWATER EXPLORATION AND PROVISION FROM THE HYDROGEOLOGICAL POINT OF VIEW,
Bundesanstalt fuer Bodenforschung, Hanover (West Germany).
For primary bibliographic entry see Field 04B.
W74-02353

EVOLVING WATER POLICY AND MANAGEMENT IN THE UNITED STATES,
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 06B.
W74-02358

STATE WATER PLAN, PROCEEDINGS OF 18TH ANNUAL NEW MEXICO WATER CONFERENCE.
For primary bibliographic entry see Field 06B.
W74-02456

STATE WATER PLAN,
For primary bibliographic entry see Field 06B.
W74-02457

REPORT BY THE NATIONAL WATER COMMISSION--A REVIEW,
Texas Water Development Board, Austin.
For primary bibliographic entry see Field 06B.
W74-02463

NEW CONCEPTS IN THE LAW OF THE SEA,
John Hopkins Univ., Washington, D.C. School of Advanced International Studies.
J. L. Hargrove.
Ocean Development and International Law Journal, Vol 1, No 1, p 5-12, Spring 1973.

Descriptors: *International law, *Political aspects, *Law of the sea, *Exploitation, *Administration, Regulation, Legal aspects, Governmental interrelations, Navigation, International waters, Jurisdiction, Straits, Mining, Resources development, Oceans, Pollution abatement, Fish conservation, Military aspects.

Two competing approaches to the law of the sea are discussed: the view that the coastal state should control activities in any large adjacent ocean areas, at least for various purposes which it deems important; and the view that most of the ocean should be left open to the free use of all nations. Both approaches have a good deal in common; these common characteristics are discussed. In the upcoming international conference these two competing approaches will be exhibited in competing claims for navigation rights, mineral resources, fishing, environmental protection and strategic uses. A possible solution is the concept of the whole ocean as a common resource of humankind, according to which no individual state has a right to benefit from the ocean except pursuant to arrangements sanctioned by the community. A suggested form of implementation would include: (1) a narrow territorial sea and various navigation guarantees, (2) a wide coastal band coupling coastal state managerial functions with permanent international prerogatives and (3) purely international management of the deep seabed. (Napolitano-Florida)
W74-02497

SCIENTIFIC ASPECTS OF MARITIME SOVEREIGNTY CLAIMS,
Scripps Institution of Oceanography, San Diego, Calif.
W. S. Wooster.
Ocean Development and International Law Journal, Vol 1, No 1, p 13-20. Spring 1973. 15 ref.

Descriptors: *International law, *Peru, *Continental shelf, *Boundary disputes, *Jurisdiction, Regulation, Currents (Water), Fish populations, Ecosystems, Sediment transport, Sea Water, Ocean currents, Temperature.

The scientific arguments used to justify Peruvian claims for extensions of maritime sovereignty are compared with available oceanographic information on the eastern South Pacific. Areas of discussion and dispute include: geographical characteristics of the Peruvian land area and submarine topography, territorial erosion, ocean currents and temperatures, and fishing resources. Comparison shows that oceanographic criteria appear to provide little support for the Peruvian position which is basically political rather than scientific in nature. (Napolitano-Florida)
W74-02498

INDICES OF NATIONAL INTEREST IN THE OCEANS,
Rhode Island Univ., Kingston. Law of the Sea Inst.
L. M. Alexander.
Ocean Development and International Law Journal, Vol 1, No 1, p 21-49, Spring 1973. 28 ref, 7 tab.

Descriptors: *International law, *Continental shelf, *Continental margins, *Jurisdiction, *Governments, International waters, Regime, Regulation, Institutional restraints, Boundary disputes, Leagal aspects, Mining, Beds under water, Fish, Fish conservation, Commercial fishing, Straits, Bays, Islands.

Each of the independent states of the world has a particular set of interests in the ocean. By analyzing the nature of national maritime interests it is possible both to develop a generalized model which can be applied to any state, and to devide states into groupings depending upon their physical characteristics with respect to the marine environment. The four basic components of national maritime interests are: accessibility, investment, dependence, and control. With reference to accessbility, land-locked, shelf-locked and states with large outer continental margins are discussed. In the area of investment, capital investment in distant-water fishing fleets, off-shore oil wells, merchant ships, marine recreational facilities and pollution control units are discussed. With reference to dependence, areas covered include proportion of labor force engaged in marine activity; the need for sea transportation of imports and exports; and claims of special legal treatment. Finally, in the area of control-purported area of jurisdiction and forms of jurisdiction, territorial sea, contiguous zones, exclusive fisheries, pollution prevention, fish conservation, and claims to seabed and subsoil are discussed. (Napolitano-Florida)
W74-02499

OCEAN SCIENCE AND MUTUAL ASSISTANCE: AN UNEASY ALLIANCE,
Columbia Univ., New York. Graduate School of Business.
G. Pontecorvo.
Ocean Development and International Law Journal, Vol 1, No 1, p 51-64, Spring 1973. 8 ref.

Descriptors: *International law, *Jurisdiction, *Administration, *Political aspects, *Legal aspects, Regulation, Institutional restraints, Exploitation, Law of the sea, Governments, Governmental interrelations, Government finance, Government supports, Economic feasibility, Economic justification, Cost-benefit analysis, Input-output analysis, Research and development.

Current negotiations over the law of the sea are concerned with, in part, the question of scientific research in the oceans. Historically, the narrow definition of territorial sea favored the major maritime powers and enabled ocean scientists to work relatively freely. Since World War II two major developments, the seaward extension of national jurisdiction and the attitude of certain nations toward the role of science in society, have begun to impinge on ocean research. The use of mutual assistance programs aimed at improving the capability of developing nations in ocean science is emphasized as a method of improving international relations and thereby creating a climate for relatively unimpeded ocean research. The necessary conditions for the operation of these programs, the costs associated with them and an approach for their implementation are discussed. (Napolitano-Florida)
W74-02500

DEVELOPMENT OF THE FREEDOM OF SCIENTIFIC RESEARCH ISSUE OF THE THIRD LAW OF THE SEA CONFERENCE,
Rhode Island Univ., Kingston.
J. A. Knauss.
Ocean Development and International Law Journal, Vol 1, No 1, p 93-120, Spring 1973. 1 tab, 47 ref, 2 append.

Descriptors: *International law, *Continental shelf, *Research and development, *Political aspects, Legal aspects, Boundary disputes, Jurisdiction, International waters, Oceanography, Pollution identification, Administration, Exploitation, Fish.
Identifiers: Coastal waters.

The importance of scientific research and the benefits that will flow to all mankind are explained and an attempt is made to differentiate between such research and those activities directly related to resources exploitation. It is believed that as a consequence of decisions relating to resource jurisdiction and other issues at the forthcoming Law of the Sea Conference, conduct of bona fide scientific research in the ocean will be made more difficult. Many nations view such research as a threat to their economic and political security. The concerns of the coastal nations are examined and suggestions made as to how some of these concerns may be alleviated. Certain sources of ocean pollution and their effect are briefly discussed as are opinions and proposals of the scientific community. Specific treaty language is proposed. (Napolitano-Florida)
W74-02501

CHALLENGES TO FEDERALISM: STATE LEGISLATION CONCERNING MARINE OIL POLLUTION,
Oregon Univ., Eugene. School of Law.
For primary bibliographic entry see Field 05G.
W74-02502

WETLAND FILL-RESTRICTIONS DO NOT CONSTITUTE A COMPENSABLE 'TAKING' WITHIN THE MEANING OF THE FIFTH AMENDMENT,
For primary bibliographic entry see Field 04A.
W74-02503

LEGAL DEVELOPMENTS IN CANADIAN WATER MANAGEMENT,
Department of the Environment, Ottawa (Ontario).
C. G. Morley.
Western Ontario Law Review, Vol 11, p 139-158, 1973. 134 ref.

Descriptors: *Federal-state water rights conflicts, *Canada, *Water quality, *Legislation, *Legal review, Water resources development, *Natural resources, Water quality standards, Law enforcement, Waste water pollution, Sources, Permits, Water pollution, Pollution, Governments.

Three recently enacted statutes and amendments to a fourth exemplify new Canadian federal initiatives in water law. Underlying these laws is the jurisdictional issue in that the various provinces retain ownership and the right to control the use of natural resources within their respective boundaries. The outer limits of federal jurisdiction are not defined. The first of the four statutes which are analyzed is the Canada Water Act which was enacted to provide a legislative framework within which the federal government could respond to the need for controls over water resource use and management. It provides for the creation of water quality management agencies for federal water and for non-federal waters if the water quality management of those waters has become a matter of urgent national concern. The Northern Inland Waters Act's objectives are to conserve, develop and utilize Canada's northern waters for all Canadians and particularly for the residents of the Yukon Territory and the Northwest Territory. The Arctic Waters Pollution Prevention Act and amendments to the Fisheries Act are also analyzed. (Gragg-Florida)
W74-02505

GROUNDWATER POLLUTION IN THE WESTERN STATES--PRIVATE REMEDIES AND FEDERAL AND STATE LEGISLATION,
For primary bibliographic entry see Field 05G.
W74-02506

EASEMENTS: JUDICIAL AND LEGISLATIVE PROTECTION OF THE PUBLIC'S RIGHTS IN FLORIDA'S BEACHES,
W. R. Bowdoin.
University of Florida Law Review, Vol 25, p 586-596, 1973. 69 ref, append.

Descriptors: *Florida, *Coasts, *Beaches, *Legal aspects, Common law, Legislation, Easements, Public access, Legal aspects, Judicial decisions.

An ever increasing public use of coastal beach property has resulted in private property owners restricting their beaches for their exclusive use. This exclusion problem in coastal states is leading to a reevaluation of the private owner's property rights. Court decisions in these states indicate that beach property is regarded as having a unique quality that requires different treatment from inland property. Courts of coastal states are protecting the interests and rights of the public through the use of easement theories. These courts have made use of three common law doctrines to establish public easements in private beaches: prescription, implied dedication, and custom. Legislative action is a fourth possibility. This commetary evaluates these four methods of establishing public easements and proposes judicial and legislative solutions to Florida's beach property problem. The custom doctrine is the best judicial remedy to protect the public's interest in Florida's beaches. (Sears-Florida)
W74-02508

PROPER TIME LIMITATIONS ON OUTER CONTINENTAL SHELF LEASES UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT,
W. M. Babovich.
Houston Law Review, Vol 10, p 158-168, October 1972. 64 ref.

Descriptors: *Alternative planning, *Alternative water use, *Environmental effects, *Legislation, Permits, Planning, Gulf of Mexico, Leases, Administrative agencies, Ecology, Judicial decisions, Legal aspects, Oil fields, Exploration.
Identifiers: National Environmental Policy Act, Injunctive relief, Energy requirements.

Natural Resources Defense Council v. Morton is noteworthy among environmental litigation as the first decision directly analyzing the National Environmental Policy Act (NEPA) requirement that alternatives to proposed governmental actions be studied to determine their effect on the environment. Plaintiffs, environmental groups, successfully brought suit to enjoin the acceptance of bids for oil and gas leases in the Gulf of Mexico. Plaintiffs contended that the federal agencies involved had insufficiently reviewed potential alternatives to the proposed leases. A preliminary injunction was affirmed, on the basis that the government had not sufficiently analyzed the available alternatives for satisfying the energy requirements of the Nation. Cases prior to the enactment of NEPA are surveyed, and the conclusion is that only certain federal agencies were required to consider the environmental effects of their actions. Cases subsequent to enactment of NEPA are surveyed and show that now every federal agency has a statutory mandate to investigate the environmental effects of its actions. The mandate of the NEPA is that alternatives to proposed government action be examined to the fullest extent possible. Unless courts require a study of alternatives available for the present time and for decades to come, the Nation may again face ecological problems on a crisis-by-crisis basis. (Gragg-Florida)
W74-02509

MICHIGAN STATE WATER POLLUTION CONTROL PLAN.
Michigan Water Resources Commission, Lansing.
For primary bibliographic entry see Field 05G.
W74-02511

PUBLIC ACCESS TO BEACHES: COMMON LAW DOCTRINES AND CONSTITUTIONAL CHALLENGES.

New York University Law Review, Vol 48, p 369-394, May 1973. 173 ref.

Descriptors: *Coasts, *Beaches, *Legal aspects, *Public access, Constitutional law, Public rights, Shores, Judicial decisions, Recreation, Seashores, Surf, Common law.
Identifiers: Public trust doctrine.

The need for special policies protecting public rights to the use of beaches has been recognized by the state courts and legislatures, as well as by the federal government. The diminishing access to beaches has led many citizens to institute legal action of some type. This note examines and evaluates the legal approaches open to the courts in their adjudication of such cases. It also deals with the question of whether efforts to expand public legal rights may have the adverse practical effect of limiting public access to beaches. The two major legal weapons available if the beach is privately owned are the doctrine of implied dedication and custom. If the beach is municipally owned, the doctrine of express dedication may be useful. The successful application of these theories depends on the facts of the given case. The litigant may also use the less fact-dependent theories of the jus publicum and public trust. Alternatively, he can use the constitutional argument that restrictions on municipally owned beaches deny nonresidents equal protection of the law. (Sears-Florida)
W74-02512

IN RE CHINESE MARITIME TRUST, LTD., (WRECK OBSTRUCTING NAVIGABLE WATERS OF THE PANAMA CANAL).

361 F. Supp. 1175-1179 (S.D.N.Y. 1972). 5 p.

Descriptors: *Panama Canal, *Navigable water, *Judicial decisions, *Navigation, *Rivers and Harbors Act, Ships, Legislation, Legal aspects, Canal zone, Canals.
Identifiers: Admiralty, Navigation obstructions.

A wreck obstructed the navigable waters of the Panama Canal. The Panama Canal Company, a government-owned corporation, sought a declaration that action for the cost of removal of a wreck obstructing navigable waters of the Panama Canal Zone was not subject to a restraining order entered in a limitation of liability proceeding. By federal statute, a ship owner can limit his liability for losses caused by the ship if those losses were incurred without the privity or knowledge of such owner. The United States District Court found as a matter of law that liability in removing wrecks was within the privity and knowledge of the owner and therefore not subject to limitation. The court made no determination on the absolute liability of the shipowners as to be held ultimately liable for the removal costs. Thus, there must be a showing that the ship was negligently sunk. The court here only precluded the shipowner from limiting his liability. (Gragg-Florida)
W74-02513

YOFFE V. SPECIAL BOARD, CHAPTER 387, (STATE DENIAL OF LICENSE TO EXPLOIT NATURAL RESOURCES OF A LAKE BED).

304 A.2d 876-879 (N.H. 1973). 4 p.

Descriptors: *Lake beds, *Dredging, *Permits, *State governments, *Legal review, Judicial decisions, Mining, *New Hampshire, Legislation, Exploitation.

Plaintiff, an individual, was denied a license to exploit natural resources located on a lake bed belonging to the State of New Hampshire by a Special Board created by the New Hampshire legislature for the purpose of deciding matters relative to resources of the state, including but not limited to excavating, dredging and filling waters of the state. The issue was whether the plaintiff was entitled to avail himself of certain statutory judicial review provisions. The state supreme court held that the plaintiff was not entitled to judicial review of the Board's decision. The court held that the statutory judicial review provisions relied on by the plaintiff were only applicable to Board decisions involving privately owned wetlands. The purpose of the review mechanism was to assure judicial scrutiny of regulation which can potentially reach a degree of restrictiveness that amounts to a taking of private property for which compensation must be paid. The court found no reason for extending this judicial protection beyond the 'privately owned wetlands situation'. (Gragg-Florida)
W74-02514

SALMON FALLS DIVISION, UPPER SNAKE RIVER PROJECT, IDAHO, PART 11.
Hearing--Subcomm. on Irrigation and Reclamation--Comm. on Interior and Insular Affairs, U.S. House of Representatives, 92d Cong, 2d Sess, May 15, 1972. 166 p.

Descriptors: *Legislation, *Irrigation, *Wildlife management, *Idaho, Water distribution, Drainage facilities, Aquatic environment, Flood control, Economics, Water resources development, Watershed management, Habitat improvement, Water management (Applied).

The Secretary of the Interior is authorized to construct, operate, and maintain the Salmon Falls division of the Upper Snake River Project in Idaho. The principal works of the division would consist of the Milner pumping plant, the Milner-Salmon Falls Canal, relief and pumping stations, water distribution facilities, and wells to provide supplemental water, and drainage facilities. The primary purposes served by the project would be irrigation and fish and wildlife enhancement. The available surface and ground water supplies of the service area have been fully utilized by local interests for irrigation but are inadequate to serve the 49,380 acres presently developed. The proposed facilities of the Salmon Falls division, together with existing facilities, would provide a full supply of water for the irrigation of 64,110 acres of land on the southside of the Snake River in Southern Idaho, including the lands now developed. The construction cost of the division is estimated at $47,252,000. (Mockler-Florida)
W74-02515

RIVER BASIN MONETARY AUTHORIZATIONS--DISASTER RELIEF ACT AMENDMENTS.
Hearing--Subcomm. on Flood Control and Internal Development--Comm. on Public Works, U.S. House of Representatives, 92d Cong, 1st Sess, November 30, 1971. 50 p.
Identifiers: *Legislation, *River basin development, *Economics, *United States, *Federal budget, Legal aspects, Water resources development, Flood control, Comprehensive planning, River basins, Water supply, Watershed management.

A bill would authorize additional appropriations for prosecution of projects in certain comprehensive river basin plans for flood control and navigation; provide for contributions by the federal

government to repair, restore, reconstruct, or replace nonprofit hospitals under the provisions of the 1970 Disaster Relief Act; provide federal financial assistance for the reconstruction or repair of private nonprofit medical care facilities which are damaged or destroyed by a major disaster; and amend the Disaster Relief Act of 1970 to authorize disaster loans with respect to certain losses arising as the result of recent natural disasters. The River Basin Monetary Authorization Act of 1970 provided funds for two calendar years to be used in thirteen river basins and for individual projects in these basins throughout the United States. The monetary authorization for certain of the river basin plans will become exhausted in a short time; therefore, it became necessary for the Congress to act on additional authorizations for funds so there will not be a discontinuance nor interruption of the projects. (Mockler-Florida)
W74-02516

COLEMAN V. FORISTER (SUIT TO ESTABLISH RIGHT OF USE OF LAND FOR INGRESS AND EGRESS TO CREEK WATERFRONT).

497 S.W.2d 530-534 (Texas 1973). 5 p.

Descriptors: *Judicial decisions, *Easements, *Banks, *Boundary dispute, *Public access, *Texas, Legal aspects.
Identifiers: Injunctive relief, Egress, Ingress, Water rights (Non-riparians).

Plaintiffs, landowners, had secured an injunction which ordered the defendants to remove a building which obstructed plaintiffs' right of ingress and egress to a creek. The defendants appealed. The plaintiffs based their claim on a conveyance which was to make waterfront privileges available. The Texas Court of Appeals, after finding that the structure would interfere with the ingress and egress of the plaintiffs, upheld the injunction, finding that the defendants had constructed the structure with full knowledge and appreciation of the risks involved in the pending litigation. (Gragg-Florida)
W74-02517

ENVIRONMENTAL PROTECTION ACT OF 1973, FIRST SESSION ON S.1104.

Hearings--Subcomm. on the Environment--Comm. on Commerce--U.S. Senate, 93d Cong, 1st Sess, April 2 and 5, 1973. 342 p.

Descriptors: *Environmental protection, *Environmental control, *Legislation, *United States, Preservation, Interstate commerce, Legal aspects.
Identifiers: Congressional hearings, Standing (Legal).

The objectives of this bill are to extend the concept of standing to sue government agencies and private parties, to remove restrictions on judicial review of administrative action, and to grant to citizens the right to sue to enforce federal agency regulations. This bill would establish a system of actual notice to potential plaintiffs for the purpose of encouraging them to join in the same litigation, thus reducing the number of suits. It would also provide for a consolidation procedure to permit merging of suits brought in different courts against the same defendant. The stated purpose of this bill is to promote and protect the free flow of interstate commerce without reasonable damage to the environment; to assure that activities which affect interstate commerce will not unreasonably injure environmental rights; to provide a right of action for relief for protection of the environment from unreasonable infringement by activities which affect interstate commerce and to establish the right of all citizens to the protection, preservation, and enhancement of the environment. (Daniels-Florida)
W74-02518

GENOVA V. CITY OF KANSAS CITY (NUISANCE ACTION BROUGHT BY LANDOWNER AGAINST CITY FOR DAMAGE TO PROPERTY ALLEGEDLY CAUSED BY FLOW OF SURFACE WATERS FROM CITY-OWNED CEMETERY).

497 S.W.2d 555-560 (Missouri 1973). 6 p.

Descriptors: *Judicial decisions, *Storm runoff, *Surface runoff, *Urban drainage, *Groundwater, Storm drains, Drain runoff, *Missouri, Rainfall intensity, Drainage water, Act of God.

The defendant, City of Kansas City (City), appealed a monetary judgment recovered by the plaintiff property owner for water damage done to plaintiff's building. The water damage was a result of the City's failure to properly maintain the boundaries of a cemetery owned by it, which allowed surface water collected in the cemetery during heavy rains to flow onto the plaintiff's land. The Missouri Court of Appeals found that the evidence supported the jury's findings that deterioration of a tile drain allowed water to collect and to be released in unnatural or increased volume onto plaintiff's property. The court found this constituted a nuisance. The defendants contended that the damage was caused by an act of God. The court defined an act of God as an event in nature so extraordinary that the history of climatic variations in the locality affords no reasonable warning of their coming. The court found that this issue had been resolved by the jury as not constituting an act of God. (Gragg-Florida)
W74-02519

STATE OF NEW JERSEY, DEPARTMENT OF ENVIRONMENTAL PROTECTION V. JERSEY CENTRAL POWER AND LIGHT COMPANY (ACTION TO ENFORCE PENALTY PROVISION FOR DISCHARGE OF HARMFUL SUBSTANCE INTO TIDAL WATERS).
308 A 2d 671-674 (N.J. 1973). 4 p.

Descriptors: *Judicial decisions, *Penalties (Legal), *Discharge, *Fishkill, *Discharge (Water), Electric generators, Tidal waters, Legal aspects, Law enforcement, *New Jersey, Fish, Cooling, Industrial water, Heat balance, Thermal pollution, Pollution abatement.

The plaintiff, the New Jersey Department of Environmental Protection, brought action against the operator of an electric generator plant for discharge of a harmful substance into tidal waters. The state sought to enforce penalty provisions for such discharge and also to collect damages from a fish kill caused by the discharge. The discharge resulted from the operation of the defendant which pumped water from one river, used it for cooling purposes and discharged it into another creek. The water discharged was warmer due to its cooling function. On the date of the discharge in question the defendant shut down its generator but continued to discharge water which was substantially cooler due to the shutdown. This lowering of the temperature caused a fish kill. The Superior Court of New Jersey found such discharge to fall within the statutory prohibition and fined the defendant. The court also charged the defendant with the value of the fish killed based on the state's obligation to ensure that the rights of the public to a viable marine environment are protected. (Gragg-Florida)
W74-02520

BARTA V. BRINEGAR (CIVIL ACTIONS BROUGHT AGAINST FEDERAL AND STATE OFFICIALS SEEKING TO ENJOIN CONSTRUCTION OF HIGHWAY SEGMENT UNTIL COMPLETION OF ENVIRONMENTAL IMPACT STUDY).
358 F. Supp. 1025-1031 (W.D. Wis. 1973). 6 p.

Descriptors: *Wetlands, *Judicial decisions, *Legislation, *Highway effects, *Environmental effects, Habitats, Highways, Marshes, *Wisconsin, Federal government, Administration, Life cycles, Aesthetics, Conservation, Ecology.
Identifiers: Injunctive relief, National Environmental Policy Act, Environmental impact statement.

The construction of a highway by the state of Wisconsin was sought to be enjoined by plaintiff landowners until a study of the impact on the environment has been completed pursuant to the National Environmental Policy Act (NEPA). The segment of highway in question passes through a marsh. The state contended that an impact statement was unnecessary based on guidelines of the Federal Highway Administration (FHWA). These guidelines provide that an impact statement need not be prepared if the project received design approval before February 1, 1971, and this project had received its approval prior to this date. The United States District Court found that the plaintiffs had standing to bring the action because the disputed construction would injure their aesthetic, conservational and recreational interests. The court then proceeded to override the FHWA transitional guidelines and granted an injunction until a NEPA impact statement could be prepared. (Gragg-Florida)
W74-02521

U.S. V. AMERICAN CYANAMID COMPANY (ACTION FOR DISCHARGE INTO NAVIGABLE WATERWAYS).

480 F.2d 1132-1135 (2d Cir. 1973). 4 p.

Descriptors: *Water pollution, *Chemical wastes, *Industrial wastes, *Water pollution control, *Judicial decisions, Law enforcement, Penalties, Legislation, Pollution abatement, Navigable waters, Streams, Protective coatings, Plastics.
Identifiers: Refuse Act of 1899.

Appellant, American Cyanamid Company, appealed from a conviction of discharging refuse into a tributary of navigable water in violation of the Refuse Act of 1899. The plaintiff operates its Standard Coated Products plant on the bank of a brook one mile from where the brook flows into the Hudson River. As a result of employee negligence a storage tank in the basement of the appellant's plant overflowed, releasing a mixture of titanium dioxide and calcium carbonate into the brook. The sole question of law involved was whether the government must establish beyond a reasonable doubt that the particular refuse discharge actually was washed into navigable water or whether it was only necessary to show that the discharge of refuse was extensive enough so it would be likely to be washed into the navigable water. The court, after reviewing the legislative history of the Refuse Act, followed the precedent of the United States Supreme Court that the Act should be interpreted broadly. The court thus held that it was not necessary to prove that the discharge actually reached navigable water. (Gragg-Florida)
W74-02522

CAMDEN SPECIAL ROAD DISTRICT OF RAY COUNTY V. TAYLOR, (ACTION BY SPECIAL ROAD DISTRICT FOR MANDATORY INJUNCTION COMPELLING LANDOWNERS TO REMOVE LEVY AND TO PERMANENTLY ENJOIN THEM FROM CONSTRUCTING LEVY).

405 S. W.2d 93-100 (Mo. Ct. App. 1973).

Descriptors: *Obstruction to flow, *Groundwater barriers, *Judicial decisions, *Surface drainage, *Flooding, Surface runoff, State jurisdiction, State government, Flood control, Levee, *Missouri, Legislation.
Identifiers: Common enemy rule.

Appellant, private landowner, appealed from an action by a special road district in which a mandatory injunction had been granted compelling the landowner to remove a levee and to permanently enjoin him from constructing a levee which would bar or impede the flow of water in the area of a public road. The action resulted from the construction of a private road by the landowner which in effect became a levee that caused the public road to be inundated. Landowner asserted an unqualified right to construct and maintain the private road by reason of the 'common enemy doctrine'. The special road district contended that the private road created a public nuisance, or in the alternative, that a state statute created an exception to the doctrine when a public road is involved. The appellate court in dissolving the injunction failed to find a public nuisance, reasoning that if the road were found to be a public nuisance because of the stoppage of the flow of surface water over the landowner's property then the whole doctrine on which the right of stoppage of surface water is based would be overthrown. The court also held that the Missouri statute did not abrogate the 'common enemy doctrine' in cases involving public roads. (Gragg-Florida)
W74-02523

ENVIRONMENTAL DEFENSE FUND, INC. V. FROEHLKE (ACTION BROUGHT FOR DECLARATORY JUDGMENT AND INJUNCTION RESTRAINING COMPLETION OF RESERVOIR PROJECT).

477 F.2d 1033-1037 (8th Cir. 1973). 5 p.

Descriptors: *Judicial decisions, *Dams, *Environmental effects, *Federal, *Arkansas, Navigation, Comprehensive planning, Dam construction, Structures, Ecology, Highway relocation, Preservation.
Identifiers: National Environmental Protection Act, Environmental impact statement, Injunctive relief.

Appellant, Environmental Defense Fund, Inc., sought an injunction restraining all construction of the Truman Dam and Reservoir Project on the Osage River in Missouri, pending the filing of an environmental impact statement by the Corps of Engineers in accord with National Environmental Policy Act. The court enjoined the Corps from proceeding with certain activities and contracts, but permitted them to continue on-going construction activities, road relocation, cemetery relocations, voluntary property acquisition and design contracts pending the filing of the final environmental impact statement. The Environmental Defense Fund appealed this partial injunction. The Court of Appeals affirmed the partial injunction finding that the trial court had not abused its discretion in granting limited injunctive relief. The court based its decision on the findings that the river and life within it would not be harmed while the environmental impact statement was being completed, and that only minimal environmental damage would be inflicted on the adjacent land during that period. (Gragg-Florida)
W74-02524

STATE OF MAINE V. M/V TAMANO (SUIT TO RECOVER DAMAGES INCURRED AS RESULT OF DISCHARGE INTO WATERS OF BAY).

357 F.Supp. 1097-1102 (D. Maine, S.D. 1973). 6 p.

Descriptors: *Oil spills, *Oil pollution, *Maine, Water pollution, State jurisdiction oil waste, Natural resources, Judicial decisions, Legal aspects, Oily water, Pollution abatement.

The state of Maine and the Board of Environmental Protection brought suit against defendant corporation for discharge from an oil tanker into the local bay. Plaintiffs sought damages in three categories: for damage to state owned property, for payment of third party claims and clean-up costs, and for the state and the state as trustee for the citizens of Maine of all natural resources. The third contention was contested by the defendants. The court recognized suits of a state, parens patriae, so that a state may care for its own in utilizing the bounties of nature within her borders because it technically owns these bounties. Thus, the defendants' protest was unsuccessful. (Daniels-Florida)
W74-02525

UNITED STATES V. LINDSAY (GOVERNMENT'S ACTION AGAINST CITY FOR ALLEGED VIOLATION OF REFUSE ACT AND NEW YORK HARBOR ACT, AND FOR CREATION OF PUBLIC NUISANCE).
357 F. Supp 784-794 (E.D. New York, 1973). 11 p.

Descriptors: *Sewage disposal, *Municipal wastes, *Sewage, *Refuse Act, *New York, Water pollution, Industrial wastes, New York Harbor Act, United States, Legislation, Judicial decisions, Governmental interrelations, Waste water disposal, Seepage, Regulation.

Plaintiff, United States Government, alleged violation of Refuse Act and New York Harbor Act and creation of a public nuisance against defendant City of New York. City's discharges from streets and sewers in liquid state flow into the surrounding navigable waters of United States. Plaintiff charged such disposal of industrial pollutants via the municipal sewer system is violation of Acts and a public nuisance under federal common law. Defendant city argued that it falls within the exemption clause which permits sewage in liquid state and further contended that federal common law may only be fashioned where no federal statute exists. The court found defendant city properly within the exemption clause even though the sewage contained some inorganic matter. The court was not prepared, at this time, to determine the defendant's claim that plaintiff may not resort to federal common law. (Daniels-Florida)
W74-02526

SEGARS V. CORNWELL (PROPERTY OWNER SUES FOR MALICIOUS PROSECUTION AGAINST CORPORATION).
196 S.E.2d 341-346 (Ct. App. Ga., Division No. 1, 1973). 6 p.

Descriptors: *Water law, *Land development, Judicial decision, Legal aspects, Recreation, *Georgia.
Identifiers: Intentional torts, Water rights (Nonriparian).

The plaintiff had purchased fifteen acres of land from the Swan Lake Development Company. The deed stated that the conveyance included lake privileges. Due to errors in the legal description, a second deed was written in which, however, the sentence concerning the lake privileges was omitted. For a time, the plaintiff paid to the defendant developer an assessment for the upkeep of the recreational facilities; when he ceased the payments, the defendant forbade him use of the lake and ultimately swore out a warrant for his arrest, charging him with criminal trespass. The plaintiff successfully defended the charge and then sued the defendant for malicious prosecution. The court found that when a subdivision is developed and sold by an owner by the establishment of a general scheme, in reliance upon which the lots are purchased, an obligation rests upon the developers to make such land use available to all purchasers equally. The court concluded that the subdivision was planned, the lake constructed, and the recreation areas set aside for the purpose of selling lots so that if the lots were contiguous to the waterfront or not, the defendant could not deny the plaintiff access to the lake. (McKnight-Florida)
W74-02527

A BILL TO PRESCRIBE PROCEDURES SO AS TO MAKE ADMINISTRATION OF THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969 MORE EFFECTIVE.

House Bill No. 5974, 93rd Cong, 1st Sess, March 21, 1973. 10 p.

Descriptors: *Legislation, *Administration, *United States, *Environment, *Environmental effects, Effects, Administrative agencies, Environmental control, Ecology, Social aspects, Legal aspects, Political aspects, Water policy, Water law, Administrative decisions, Regulation, Federal government.
Identifiers: National Environmental Policy Act of 1969, Environmental impact statement.

Amendments were proposed to the National Environmental Policy Act of 1969 (Act) so as to make administration of the Act more effective. The amendments proposed that the Act be clarified to more precisely define the procedural requirements placed upon federal departments and agencies so as to eliminate delay, duplication and overlap, as well as to weigh environmental values with other public interests and values and to balance environmental values with other national policies and goals. Specifically, the amendments require that in connection with any proposed federal legislation or major federal action significantly affecting the quality of the human environment, an environmental impact statement will be developed assessing the environmental impact of the proposed legislation, adverse environmental effects, and alternatives to the proposed action. (Glickman-Florida)
W74-02528

A BILL TO AUTHORIZE THE SECRETARY OF THE INTERIOR TO CONSTRUCT, OPERATE, AND MAINTAIN THE POLLOCK-HERREID UNIT, SOUTH DAKOTA PUMPING DIVISION, MISSOURI RIVER BASIN PROJECT, SOUTH DAKOTA.

Senate Bill No. 1577, 93rd Cong, 1st Sess, April 13, 1973. 2 p.

Descriptors: *River basins, *River basin development, *Irrigation, *Water supply, *South Dakota, Land management, Water supply, Irrigation, Operation and maintenance, Irrigation systems, Water storage, Structures, Reservoir construction, Reservoir operation, Reservoir sites, Reservoir, Reservoir storage, Wildlife conservation, Legislation, United States.
Identifiers: Missouri River Basin Project.

A bill authorizes the Secretary of the Interior to construct, operate and maintain the Pollock-Herreid unit, South Dakota pumping division of the Missouri River Basin project for the purposes of irrigation, municipal and industrial water supply and fish and wildlife enhancement. The principal works of the project include the main pumping plant, the storage reservoir, a system of main canals and laterals, a regulating reservoir, seven relift pumping plants and the necessary drainage facilities. (Glickman-Florida)
W74-02529

CITY OF HOLLYWOOD V. YARBOROUGH (REVIEW OF PUBLIC SERVICE COMMISSION ORDER AUTHORIZING UTILITY TO PROVIDE WATER SERVICE IN UNINCORPORATED AREA WHICH PETITIONER CLAIMED TO HAVE EXCLUSIVE CONTROL OVER).

274 So. 2d 526-529 (Fla. 1973).

Descriptors: *Florida, *Public utilities, *Water works, *Water supply, Water distribution (Applied), Regulation, Competition, Judicial decisions, Legal aspects, Cities, Legislation, Monopoly.

Identifiers: Notice, Public service commission.

The City of Hollywood (City) as petitioner brought suit challenging a Public Service Commission (Commission) order authorizing Modern Pollution Control, Inc. (Modern) to provide water service in an area over which the City of Hollywood alleged that it had exclusive control. The petitioner maintained that the Commission had exceeded its authority by assigning a portion of the City's territory to Modern. The court found that while the Commission is prohibited from asserting regulatory jurisdiction over the City, it is at the same time given jurisdiction over the issuance of certificates authorizing a utility to provide water services to the public and that this is so even when to do so will create competition with any other water system, if the Commission determines that such other system is inadequate to meet the reasonable needs of the public. In the situation at bar, the Commission was not, the court concluded, trying to regulate the operation of the City's water service, but only to provide water services to meet public needs in the area in question. Under these circumstances, any regulatory effect on the City was so indirect that it was overcome by the needs of the public so that the order in question was valid. (McKnight-Florida)
W74-02530

CANYON PUBLIC SERVICE DISTRICT V. TASA COAL COMPANY (EMINENT DOMAIN PROCEEDING HELD PUBLIC SERVICE DISTRICT HAD RIGHT TO CONDEMN DEFENDANT'S LANDS FOR USE IN CONNECTION WITH SEWER FACILITIES, DEFENDANT APPEALS).

195 S.E.2d 647-653 (Sup. Ct. App. W.Va. 1973).

Descriptors: *Eminent domain, *Condemnation, *Public utility district, Sewerage disposal, Public utilities, Sewage districts, Judicial decisions, Sewerage, *West Virginia.

Plaintiff, a public service district, brought eminent domain proceeding against defendant corporation to condemn defendant's lands for use in connection with sewer facilities. Defendant contended that plaintiff was not a legally constituted public service district because: less than 100 voters resided and owned property in the district at the time of its creation; petitioner was created solely for the purpose of supplying water; and the order fixing the date for hearing didn't comply with statutory requirements. Court found no merit in the first contention since the county court could create the district on its own motion. On the other questions, the court held that substantial compliance with statutory requirements was sufficient but since the district was created only for the purpose of furnishing water services, it had no power to condemn real estate for sewage facilities. (Daniels-Florida)
W74-02531

KELLY V. ALPSTETTEN ASSOCIATION, INC. (ACTION TO ENJOIN TERMINATION OF WATER SERVICE, WHEREIN DEFENDANT COUNTERCLAIMED FOR BACK CHARGES).
303 A.2d 136-139 (Vt. 1973).

Descriptors: *Spring waters, *Water rights, *Prescriptive rights, Water service, Injunction, Water supply, Underground water, Public utilities, Water distribution (Applied), Judicial decisions, Legal aspects, *Vermont.

Plaintiff brought a declaratory action seeking to prevent the shutting off of water to premises owned by him and to have his rights to take water from the system declared. The defendant, owner of the water system, countered, seeking to establish a duty in the plaintiff to pay for his water service and to confirm the defendant corporation's right to terminate service. The state supreme court held that where the issue of whether defendant was entitled to shut off water to premises owned by plaintiff depended on factual determination with respect to public nature of defendant not made by trial court in granting an injunction, remand was necessary for such determination. (Daniels-Florida)
W74-02532

LEGAL AND INSTITUTIONAL CONSTRAINTS IN CONSOLIDATING IRRIGATION SYSTEMS,
Colorado State Univ., Fort Collins. Dept. of Economics.
For primary bibliographic entry see Field 03F.
W74-02533

STATE V. PLACID OIL COMPANY (ACTION BY STATE TO ESTABLISH ITS OWNERSHIP OF SUBMERGED LANDS).

274 So. 2d 402-432 (Ct. App. La. 1973).

Descriptors: *Louisiana, *Judicial decisions, *Submerged lands, Leases, Oil industry, Natural resources, Exploitation, Oil reservoirs, Ownership of beds, Boundaries (Property), High water mark, Low water mark, Watercourses (Legal aspects).

A petitory action by the State of Louisiana and its mineral lessee to have the state declared the owner of parcels of land lying below ordinary high-water-mark of a body of water alleged to be a stream is described. Plaintiff also asked for an accounting of proceeds of oil wells drilled by the defendant oil companies on the subject property. The Court of Appeals prospectively applied a 1952 statute. The statute indicated that any ownership changes which resulted from a change of course of a navigable stream which followed the date of the 1956 mineral lease from the state were without prejudice to the lessee's interest with respect to the owners of such land or water bottoms. As a result the action was remanded for the limited purpose of permitting the litigants to establish the ordinary low-water mark in the areas of controversy as of the date of the 1956 lease. Moreover, the court emphasized that the statute was not unconstitutional as long as it was given prospective and not retrospective effect. (Mockler-Florida)
W74-02534

REGIONAL WATER, SEWAGE, AND SOLID WASTE DISTRICTS.
For primary bibliographic entry see Field 05D.
W74-02535

LEVEES AND DRAINS--CHANGE OF WATER--COURSES.
Indiana Ann. Stat. secs 48-4602 thru 48-4651 (Supp. 1972).

Descriptors: *Indiana, *Statutes, *Levees, *Drainage, Water control, Legal aspects, Flood control, Drainage systems, Routing, Water distribution, Water conveyance, Supply, Transfer, Water supply, Water utilization, Roads.

Indiana Annotated statutes deal with levees, drains, and changes of watercourses. The statutes provide that the board of public works may appropriate land for the purpose of constructing a levee for the prevention of the overflow of lands and may also build a street upon the levee. Moreover, when land is appropriated for this purpose, the board is authorized to adopt a resolution declaring that purpose and to proceed with the proper plans and specifications for the proposed works, which records shall be open to the public. Final orders, damages, benefits, appeal procedures, assessments and liens, contracts, with landowners, drainage improvement proceedings, hearings, notice requirements, petitioning procedures, and the right to acquire property for the completion of work or improvements are also dealt with by the statutes and applicable annotations. (Mockler-Florida)
W74-02536

SOIL AND WATER CONSERVATION DISTRICTS.
Ala. Code tit 2, secs 659 (1) thru 663 (Supp. 1971).

Descriptors: *Legislation, *Soil conservation, *Alabama, *Erosion control, Administration, Jurisdiction, Land use, Planning, Soil erosion, Vegetation establishment, Soil stabilization, Conservation, Land development.

An act by the Alabama Legislature changes the name of the State Soil Conservation Committee and Soil Conservation districts, create soil and water conservation districts, disannexes territory from one district and includes it in another, and changes the name of several soil districts. Moreover, the Act provides that a soil and water conservation district organized under the provisions of this chapter shall constitute a governmental subdivision of the state and a public body corporate and politic, exercising public powers, and such districts shall have the power to carry out preventive and control measures including engineering operations, methods of cultivation, the growing of vegetation, changes in use of land, and other erosion control measures on lands owned or controlled by the state. It may also conduct surveys, investigations, and research relating to the character of soil erosion and the preventive and control measures needed; publish the results of such surveys; and disseminate information concerning such preventive and control measures. (Mockler-Florida)
W74-02537

SUBMERGED LANDS.
43 U.S.C. secs 1301 thru 1343 (1970).

Descriptors: *Legislation, *Submerged lands, *United States, *Continental shelf, Tidal waters legal aspects, Jurisdiction, Governments, Intergovernmental relations, Oil leases.

These are the United States Code sections dealing with submerged lands. The statutes provide that it is in the public interest that title to and ownership of the lands beneath navigable waters within the boundaries of the respective states, the natural resources within such lands and waters, and the right and power to manage, administer, lease, develop, and use the lands and natural resources be confirmed and established. Moreover, the statutes provide that the Constitution and laws of the United States are extended to the subsoil and seabed of the outer continental shelf and to all artificial islands and fixed structures which may be erected thereon for the purpose of exploring for, developing, removing, and transporting resources therefrom, to the same extent as if the Outer Continental Shelf were an area of exclusive federal jurisdiction located within a state. The statutes also provide for seaward boundaries of states, rights and powers retained by the United States, administration of leasing, validation and maintenance of prior leases, and granting of leases by the Secretary of the Interior. (Mockler-Florida)
W74-02540

6F. Nonstructural Alternatives

FLOODPLAIN MAPPING AND PLANNING FOR THE 50 AND 100 YEAR INTERVAL FLOOD ZONES OF THE BITTERROOT VALLEY, MONTANA,
Montana Univ., Missoula.
For primary bibliographic entry see Field 04A.
W74-02215

6G. Ecologic Impact of Water Development

WETLAND FILL-RESTRICTIONS DO NOT CONSTITUTE A COMPENSABLE 'TAKING' WITHIN THE MEANING OF THE FIFTH AMENDMENT,
For primary bibliographic entry see Field 04A.
W74-02503

OGUNQUIT SAND DUNE LAND STABILIZATION MEASURE, YORK COUNTY IN MAINE, THRESHOLD TO MAINE RESOURCE CONSERVATION AND DEVELOPMENT PROJECT (FINAL ENVIRONMENTAL STATEMENT).
Soil Conservation Service, Orono, Maine
For primary bibliographic entry see Field 04A.
W74-02504

ENVIRONMENTAL PROTECTION ACT OF 1973, FIRST SESSION ON S.1104.
For primary bibliographic entry see Field 06E.
W74-02518

BARTA V. BRINEGAR (CIVIL ACTIONS BROUGHT AGAINST FEDERAL AND STATE OFFICIALS SEEKING TO ENJOIN CONSTRUCTION OF HIGHWAY SEGMENT UNTIL COMPLETION OF ENVIRONMENTAL IMPACT STUDY).
For primary bibliographic entry see Field 06E.
W74-02521

ENVIRONMENTAL DEFENSE FUND, INC. V. FROEHLKE (ACTION BROUGHT FOR DECLARATORY JUDGMENT AND INJUNCTION RESTRAINING COMPLETION OF RESERVOIR PROJECT).
For primary bibliographic entry see Field 06E.
W74-02524

07. RESOURCES DATA

7B. Data Acquisition

A NEW OSCILLATING WATER TUNNEL,
Queen's Univ., Kingston (Ontario). Coastal Engineering Research Lab.
For primary bibliographic entry see Field 02J.
W74-02160

A SHEAR PLATE FOR USE IN OSCILLATORY FLOW,
Queen's Univ., Kingston (Ontario). Coastal Engineering Research Lab.
For primary bibliographic entry see Field 02E.
W74-02161

DETECTION OF POLLUTANTS IN WATER BY RAMAN SPECTROSCOPY,
Brown, Boveri und Cie, A.G., Heidelberg (West Germany).
For primary bibliographic entry see Field 05A.
W74-02164

CALIBRATING A WATER YIELD MODEL FOR SMALL UNGAGED WATERSHEDS,
Kentucky Dept. of Natural Resources, Frankfort. Div. of Water.
For primary bibliographic entry see Field 02A.
W74-02172

HYDROLOGIC SIMULATION MODEL OF COLORADO SUBALPINE FOREST,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
C. F. Leaf, and G. E. Brink.
USDA Forest Service Research Paper RM-107, May, 1973. 23 p. 1 tab, 10 fig, 1 append, 20 ref.

Descriptors: *Forest watersheds, *Watershed management, Hydrologic systems, *Simulation analysis, Model studies, *Water balance, *Computer models, Computer programs, Snowmelt, Evapotranspiration, Vegetation effects, Forest management, Coniferous forests, *Colorado.
Identifiers: Subalpine hydrology.

A simulation model specifically designed to determine the probable hydrologic changes resulting from watershed management in the Colorado subalpine zone is described. The model simulates the total water balance on a continuous year-round basis and compiles the results from individual hydrologic response units into a composite overview of an entire drainage basin. Preliminary results for an 8-year test period on a 667-acre experimental watershed are summarized. (Brown-IPC)
W74-02248

AN ENCLOSED WEIR FOR SMALL STREAMS IN SNOW COUNTRY,
Forest Service (USDA), Fort Collins, Colo. Rocky Mountain Forest and Range Experiment Station.
K. L. Johnson, and R. D. Tabler.
USDA Forest Service Research Note RM-238, May 1973. 8 p. 7 fig, 2 ref.

Descriptors: Watershed management, *Weirs, *Flow measurement, *Winter, *Streamflow, Engineering structures, Costs, Operating costs, Capital costs, Snow.
Identifiers: Measurement systems.

An enclosed, sharp-crested, V-notch weir was designed to gage small channels under severe winter conditions at reduced costs of installation and operation. The self-contained structure consists of a multiplate pipe arch with closed ends fitted over and independent cutoff wall. The instrument shelter is mounted directly on the arch over a stilling well assembly placed within the weir basin. The structure provides trouble-free winter operation. Compared to a conventional design, the time of construction was reduced 50% and total costs by 40%. (Brown-IPC)
W74-02249

ULTRASONIC RIVER FLOW MEASUREMENT,
Atomic Energy Research Establishment, Harwell (England).
For primary bibliographic entry see Field 02E.
W74-02250

COMPARISON OF RAINGAUGE EVAPORATION SUPPRESSANTS,
Otago Univ., Dunedin (New Zealand). Dept. of Geography.
For primary bibliographic entry see Field 02D.
W74-02289

DESIGN, OPERATION, AND TEMPERATURE SENSITIVITY OF A THERMOCOUPLE PSYCHROMETER MOISTURE POTENTIOMETER BASED ON THE PELTIER EFFECT, (KONSTRUKTSIYA, METODIKA PRIMENENIYA I TEMPERATURNAYA CHUVSTVITEL'NOST' TERMOPARNOGO PSIKHROMETRICHESKOGO VLAGOPOTENTSIOMETRA, OSNOVANNOGO NA EFFEKTE PEL'T'YE),
Agrofizicheskii Nauchno-Issledovatelskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 02G.
W74-02303

AN AIRBORNE GAMMA SURVEY OF MOISTURE CONTENT IN THE SURFACE DETENTION LAYER, (SAMOLETNAYA GAMMA-S'YEMKA ZAPASOV VLAGI V SLOYE POVERKHNOSTNOGO ZADERZHANIYA),
Institut Prikladnoi Geofiziki, Moscow (USSR).
For primary bibliographic entry see Field 02G.
W74-02307

SAMPLING TECHNIQUES IN CHROMATOGRAPHY,
Waterloo Univ. (Ontario). Dept. of Chemistry.
F. W. Karasek.
Research Development, Vol 24, No 9, p 54-57, September 1973. 4 fig, 15 ref.

Descriptors: *Gas chromatography, *Sampling, Mechanical equipment, Instrumentation, Valves.
Identifiers: *Sample injection, Syringes, Liquid chromatography.

Methods and problems associated with sample introduction in gas chromatography are discussed. The most widely used method employs a syringe to inject the sample through a septum. Reproducibility is plus or minus 1 percent. However, problems such as septum leakage, sample blowback in the syringe, and nonlinear volatilization of sample may destroy the accuracy of results. Valves have also been developed for sample injection. These can perform many thousands of sample injections (versus 50-80 for a septum) and can be used for backflushing, column or sample selection, detector switching, and concentration techniques. Valves also are frequently used in process chromatographs under automatic control and provide reproducibility of better than plus or minus 1 percent. Many of the procedures used with GC are useful for liquid chromatography. (Little-Battelle)
W74-02372

PRINTOUT COLORIMETER FOR AUTOANALYSIS OF WATER POLLUTION,
Upper Tame Main Drainage Authority, Birmingham (England).
For primary bibliographic entry see Field 05A.
W74-02374

A PNEUMATIC SAMPLE CHANGER FOR GAMMA-RAY SPECTROSCOPY,
Geological Survey, Washington, D.C.
C. J. Massoni, R. V. Fones, and F. O. Simon.
Review of Scientific Instruments, Vol 44, No 9, p 1350-1352, September 1973. 2 fig.

Descriptors: *Instrumentation, *Automatic control, Reliability.
Identifiers: *Gamma ray spectroscopy, Sample changers.

The capacity of gamma-ray spectroscopy equipment was increased by the addition of a gravity-fed, pneumatic-ejection sample changer. The changer is designed for solid samples which are placed in polyethylene rabbits 1.65 cm in diam and 5.50 cm long. These are made by cutting off the hinge and opening tab from a 7.4-ml polyethylene vial. Operation of the changer and the associated electronics are described. The electronic circuitry has a fail-safe feature which stops the operation of the changer if a malfunction occurs. The system has proved to be more than 99 percent reliable. (Little-Battelle)
W74-02407

AN IMPROVED BOTTOM-WATER SAMPLER,
University Coll. of Swansea (Wales). Dept. of Geology and Oceanography.
J. R. Joyce.
Journal of the Marine Biological Association of the United Kingdom, Vol 53, No 3, p 741-744, August 1973. 1 fig, 6 ref.

Descriptors: *Sampling, Mechanical equipment, Water, Design criteria, Sea water, Fabrication, *Water sampling, Bottom sampling.

Identifiers: *Bottom water sampler.

A sampler for collecting water at predetermined points above the sediment-water interface consists of a frame containing six inverted PVC bottles. The bottom of each bottle has a hole drilled in it which is fitted with a simple perspex flap valve. Silico-rubber tubing is attached to the neck of each bottle and passes through a trigger bar which is connected to an actuating weight and two support bars. The tubes pass through holes in the side plating at different (interchangeable) levels to collect samples at predetermined points above the sediment. The sampler can be actuated at any depth. This device has been successfully used in a study of the Tawe estuary, where a bottom layer of high-turbidity, low-salinity water has been discovered. (Little-Battelle)
W74-02410

HIGH PRECISION SAMPLING FOR CHROMATOGRAPHIC SEPARATIONS,
National Bureau of Standards, Washington, D.C. Analytical Chemistry Div.
For primary bibliographic entry see Field 02K.
W74-02414

AN AUTOMATED ANALYSIS FOR UREA IN SEAWATER,
Oregon State Univ., Corvallis. School of Oceanography.
For primary bibliographic entry see Field 05A.
W74-02421

AERIAL REMOTE SENSING OF CARBONATE TERRANES IN SHELBY COUNTY, ALABAMA,
Geological Survey, University, Ala.
W. M. Warren, and C. C. Wielchowsky.
Ground Water, Vol 11, No 6, p 14-26, November-December 1973. 8 fig, 17 ref.

Descriptors: *Remote sensing, *Terrain analysis, *Karst, *Alabama, *Land subsidence, Mapping, Surveys, Topography, Geologic mapping, Radar, Aerial photography, Karst hydrology, Structural geology, Hydrogeology.
Identifiers: Shelby County (Ala).

Remotely sensed data are used by the Geological Survey of Alabama in the study of subsidence and collapse problems in several carbonate terranes. Active areas in Shelby County, Alabama, were delineated by on-the-ground inspection and by use of airborne remote sensors. These active terranes present problems to those who presently live in the area as well as to those who will be involved in the future development of this region; therefore, techniques must be found that can be used to predict subsidence and collapse. In a 70-square-mile test area in the county aerial infrared photography, thermography, and side-looking airborne radar (SLAR) imagery can be used for (1) locating, inventorying, and monitoring sinkholes; (2) predicting potential collapses; (3) mapping fracture traces, lineaments, regional geologic structure, and alignment of sinkholes; and (4) assisting general project planning. Time and effort can be saved by using remote-sensing techniques because large areas can be examined in a very short period of time. (Knapp-USGS)
W74-02467

SYSTEM FOR MONITORING CONTAMINANTS IN LIQUIDS,
For primary bibliographic entry see Field 05A.
W74-02493

A NEW AQUATIC INSECT TRAP,
Union Carbide Corp., Tarrytown, N.Y.
A. W. Fast.
Mich Acad. Vol 5, No 1, p 115-124. 1972. Illus.
Identifiers: *Aquatic insects, *Insect traps, Lakes, Midges, Oxygen, Periphyton, Predation.

A submerged insect trap is described and compared with another type of submerged trap. Six variations of the trap are compared. Submerged suspended traps are basically inefficient and should not be used. Submerged bottom traps should be used in deep water. Floating box traps, tent traps and pyramid traps may be used in shallow water. If floating pyramid or bottom traps are used, the contents of the entire trap must be collected. In some weedy areas, a floating trap is the only appropriate kind. Traps should be serviced and moved daily to prevent losses due to decomposition, predation and sinking. Daily servicing will also avoid oxygen depletion and reduced recruitment problems. Clear plastic or screened traps should be used rather than opaque traps. Traps that cut off both light and water circulation lead to oxygen depletion and cessation of emergence. Traps that cut off water circulation appear to lead to reduced recruitment. Traps should be dried out periodically to prevent periphyton growths and midge attachment.--Copyright 1973, Biological Abstracts, Inc.
W74-02551

ERTS-1 IMAGE CONTRIBUTES TO UNDERSTANDING OF GEOLOGIC STRUCTURES RELATED TO MANAGUA EARTHQUAKE, 1972,
Geological Survey, Washington, D.C.
W. D. Carter, and G. P. Eaton.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Administration Rept NASA SP-327, p 459-471, 1973. 8 fig, 1 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Geologic mapping, *Earthquakes, *Structural geology, Surveys, Disasters, Faults (Geologic), Data collections, Hazards.
Identifiers: ERTS, *Managua (Nicaragua).

ERTS-1 imaged the western portion of Nicaragua on December 24, 1972, one day after the central part of the city of Managua was devastated by a major earthquake which measured 5.6 on the Richter scale. ERTS-1 images reveal four sets of lineaments (which may reflect fault systems) among any one of which movement could have taken place. One set, trending N 50 deg W, includes a line of active volcanoes that parallels the coast and constitutes the southwestern edge of the Nicaraguan Depression, a regional graben which cuts obliquely across the Central American isthmus. A parallel lineament, north of Lake Managua, marks the northeast edge of the graben. A less conspicuous set is represented by only three identified members within Nicaragua. Two others, which are subparalle, are visible on the image in the area of Honduras, to the northwest. This set is notable for the fact that it extends from the coast entirely across the Nicaraguan Depression. This set is represented by four currently active, left-lateral, strike-slip faults and a narrow belt of aftershock epicenters. (See also W74-01663 and W74-02562 thru W74-02604) (Knapp-USGS)
W74-02561

RECOGNITION OF SURFACE LITHOLOGIC AND TOPOGRAPHIC PATTERNS IN SOUTHWEST COLORADO WITH ADP TECHNIQUES,
Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
W. N. Melhorn, and S. Sinnock.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 473-481, 1973. 4 fig, 1 tab, 4 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Geologic mapping, *Structural geology, *Terrain analysis, Topography, Surveys, Mapping, Geomorphology, Data collections, Colorado.
Identifiers: ERTS.

Analysis of ERTS-1 multispectral data by automatic pattern recognition procedures is applicable in studies of resource stresses by providing a means for refining existing geologic maps. Machine recognition of extensive surface lithologic and topographic patterns is possible. Automatic mapping of a series of hogbacks, strike valleys, and alluvial surfaces along the northwest flank of the San Juan basin in Colorado was obtained in a test study by man-machine interaction using minimal human input. The determination of causes for separable spectral signatures is dependent upon extensive correlation of field-based ground truth observations and aircraft underflight data with the satellite data. (See also W74-02561) (Knapp-USGS)
W74-02562

ERTS-1 IMAGERY AS AN AID TO THE DEFINITION OF THE GEOTECTONIC DOMAINS OF THE SOUTHERN AFRICAN CRYSTALLINE SHIELD,
Johannesburg Consolidated Investment Co. Ltd., Randfontein (South Africa). Geological Research Dept.
M. J. Viljoen, and R. P. Viljoen.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 483-491, 1973. 6 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Structural geology, *Geologic mapping, Surveys, Mapping, Data collections, Africa, Terrain analysis, Geomorphology.
Identifiers: ERTS, *South Africa.

ERTS data can be used to identify ancient granite-greenstone cratons and the metamorphic mobile belts, the two major geotectonic units of the Southern African Crystalline Shield. Each has its own distinctive structural style. The broad synoptic view provided by ERTS imagery is ideally suited to a study of the diagnostic macrostructures, and the different geotectonic styles are clearly recorded. ERTS-1 imagery thus allows a more accurate definition than exists at present of the contact zones and internal structures of the two domains. (See also W74-02561) (Knapp-USGS)
W74-02563

NEW ASPECTS ON THE TECTONIC OF THE ALPS AND THE APENNINES REVEALED BY ERTS-1 DATA,
Zentralstelle fuer Geo-Photogrammetrie und Fernerkundung, Munich (West Germany).
J. Bodechtel, and B. Lammerer.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 493-399, 1973. 7 fig.

Descriptors: *Remote sensing, *Satellite (Artificial), *Geologic mapping, *Structural geology, *Alpine, Mountains, Geomorphology, Terrain analysis, Data collections, Faults (Geologic), Surveys.
Identifiers: ERTS, *Alps.

The Alpine region is one of the most complicated and best investigated parts of the world. Therefore, it is very interesting to compare the ground truth with data revealed by ERTS-1 imagery. Large lineaments shown by ERTS are not influenced by nappe systems or specific rock properties. Therefore, they can be assumed to have been formed during a very late stage of the Alpine orogeny. Their occurrence in pairs and their straight courses give strong evidence for shearing movement. The whole Alpine body has been affected by a compressing force after nappe trans-

port, and the locally detected strike-slip faults are now shown by ERTS to belong to a hugh and extended shearing system. This system is not limited to the Alps, but it extends to the molasse foreland. In this foreland with its weak sediments, faults and fractures are difficult to detect. ERTS-1 imageries show the pattern of lineaments very clearly. These lineaments often end at the Alpine margin or the folded part of the molasse. This folded part of the molasse probably buffered the stress down to the amount in which a shearing system could develop instead of folding or nappe overthrusts. The knowledge of the tectonic evolution and the structural pattern of the molasse may become important for petroleum prospecting. (See also W74-02561) (Knapp-USGS)
W74-02564

STRUCTURAL LINEAMENTS OF GASPE FROM ERTS IMAGERY,
R. Steffensen.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 501-515, 1973. 5 fig, 13 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Geologic mapping, *Structural geology, Canada, Surveys, Data collections, Faults (Geologic), Stratigraphy, Geomorphology.
Identifiers: ERTS, *Gaspe.

A test study was conducted to assess the value of ERTS images for mapping geologic features of the Gaspe Peninsula, Quebec. Of the four spectral bands of the multispectral scanner, the band from 700 to 800 nanometers, which seems to possess the best informational content for geologic study, was selected for analysis. Structural lineaments were outlined and classified according to five categories: morpho-lithologic boundaries, morpho-lithologic lineaments, fault traces, fracture zones and undefined lineaments. Comparison with the geologic map of Gaspe shows that morpho-lithologic boundaries correspond to contacts between regional stratigraphic units. Morpho-lithologic lineaments follow bedding trends, whereas fracture traces appear as sets of parallel lineaments, intersecting at high angles the previous category of lineaments. Fault traces mark more precisely the location of faults already mapped and spot the presence of faults not indicated on the geologic map. As a tool for mineral exploration the structural lineaments map of Gaspe can be used to improve the understanding of the tectonic framework of the Peninsula, to direct exploration efforts over specific target areas, to assist in deciphering the meaning of geophysical survey data, and to support the delineation of trends in the distribution of regional geochemical anomalies. (See also W74-02461) (Knapp-USGS)
W74-02565

LINEAMENTS IN COASTAL PLAIN SEDIMENTS AS SEEN IN ERTS IMAGERY,
Geological Survey, Reston, Va. EROS Program Office.
C. F. Withington.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 517-521, 1973. 1 fig, 1 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Coastal Plains, *Geologic mapping, *Structural geology, Virginia, Maryland, Earthquakes, Data collections.
Identifiers: ERTS.

Examination of satellite imagery over the Atlantic Coastal Plain near Washington, D.C., shows numerous lineaments, which cannot be accounted for by any known cultural or natural features. At least some of these lineaments represent the surface expression of faults, for one of them has been correlated with the outcrop of a fault that had been traced for several miles in southern Prince Georges County, Maryland. If a substantial number of these lineaments do indeed represent fault traces, the fact that they show on the surface suggests that the geologic history of the Coastal Plain is much more compiex than has previously been recognized, and that faulting may have occurred in the Holocene, much later than has generally been recognized. The importance that such recent movements could have on future development of the Coastal Plain should emphasized. (See also W74-02561) (Knapp-USGS)
W74-02566

EVALUATION OF COMMERCIAL UTILITY OF ERTS-A IMAGERY IN STRUCTURAL RECONNAISSANCE FOR MINERALS AND PETROLEUM,
Texas Instruments, Inc., Dallas.
D. F. Saunders, and G. E. Thomas.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 523-530, 1973. 8 fig, 17 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Exploration, *Surveys, Geologic mapping, Structural geology, Mining, Oil fields, Data collections, Data processing, Mapping, Terrain analysis.
Identifiers: ERTS.

Five areas in North America (North Slope-Alaska, Superior Province-Canada, Williston basin-Montana, Colorado and New Mexico-West Texas) are being studied for discernibility of geological evidence on ERTS-A imagery. ERTS data are compared with known mineral and hydrocarbon accumultions to determine the value of the imagery in commercial exploration programs. Clearly discernible structural lineaments in New Mexico-West Texas are evident on the photographs. Comparison of this evidence with known major mining localities in New Mexico indicates a clear pattern of coincidence between the lineaments and mining localities. In West Texas, lineament and geomorphological evidence obtainable from the photographs define the petroleum-productive Central Basin Platform. ERTS-A imagery should be extremely valuable in defining the regional and local structure in any commercial exploration program. (See also W74-02561) (Knapp-USGS)
W74-02567

STRUCTURAL INTERPRETATIONS BASED ON ERTS-1 IMAGERY, BIGHORN REGION, WYOMING-MONTANA,
Iowa Univ., Iowa City. Dept. of Geology.
R. A. Hoppins.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 531-538, 1973. 3 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Structural geology, *Geologic mapping, Surveys, Wyoming, Montana, Data collections, Terrain analysis, Geomorphology, Mapping.
Identifiers: *Bighorns (Wyo-Mont), ERTS.

Structural analysis of the Bighorn region of Wyoming and Montana is being carried out on ERTS bands MSS 5 and 7. Geologic structure is primarily revealed in topographic relief and drainage. Topographic linears are particularly well developed in the Bighorn uplift. Many of these occur along known faults and shear zones in the Precambrian core; several have not been previously mapped. These linears, however, do not continue into the younger rocks of the flanks or do so in a much less marked manner than in the core. Linears are far less abundant in the basin or are minifested only in very subtle tonal contrasts and straight drainage segments. Some of the linears are aligned along trends previously postulated on the basis of surface mapping to be lineaments. The imagery reveals little or no evidence of strike-slip displacements along these lineaments. Larger folds show up very well. (See also W74-02561) (Knapp-USGS)
W74-02568

APPLICABILITY OF ERTS-1 TO LINEAMENT AND PHOTOGEOLOGIC MAPPING IN MONTANA--PRELIMINARY REPORT,
Montana Univ., Missoula.
R. M. Weidman, D. D. Alt, R. E. Flood, Jr., K. T. Hawley, and L. K. Wackwitz.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 539-546, 1973. 4 fig, 5 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Structural geology, *Geologic mapping, Surveys, Wyoming, Montana, Data collections, Terrain analysis, Geomorphology, Mapping.
Identifiers: ERTS.

A lineament map prepared from a mosaic of western Montana shows about 85 lines not represented on the state geologic map, including elements of a northeast-trending set through central western Montana which merit ground truth checking and consideration in regional structural analysis. Experimental fold annotation resulted in a significant local correction to the state geologic map. Photogeologic mapping studies produced only limited success in identification of rock types, but they did result in the precise delineation of a late Cretaceous or early Tertiary volcanic field (Adel Mountain field) and the mapping of a connection between two granitic bodies shown on the state map. Imagery was used successfully to map clay pans associated with bentonite beds in gently dipping Bearpaw Shale. ERTS imagery should be used to facilitate preparation of a statewide tectonic map. Satellite imagery mapping, aided by ground calibration, provides an economical means to discover and correct errors in the state geologic map. (See also W74-02561) (Knapp-USGS)
W74-02569

A NEW FAULT LINEAMENT IN SOUTHERN CALIFORNIA,
California Univ., Riverside. Dept. of Geography.
R. W. Pease, and C. W. Johnson.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 547-552, 1973. 6 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Structural geology, *Earthquakes, Geologic mapping, Mapping, Faults (Geologic), Data collections, Seismic studies, California.
Identifiers: ERTS.

ERTS-1 imagery clearly shows a 50-mile-wide tectonic zone across Southern California oriented about 15 deg to the structures of the Transverse Ranges or with an azimuth of 70 deg. The zone is delineated on the imagery by terrain alignments and vegetational differences. A previously undisclosed tectonic lineament extends across the Mojave Desert and appears as a line of crustal upwarping. Pressures which would have caused this plus the occurrence of many thrust faults with the 70 deg azimuth indicate this to be a zone of crustal compression. Recent earthquake epicenters appear to be related to this compression zone rather

than the traditional fault network of Southern California. (See also W74-02561) (Knapp-USGS)
W74-02570

FRACTURE MAPPING AND STRIP MINE INVENTORY IN THE MIDWEST BY USING ERTS-1 IMAGERY,
Geological Survey, Bloomington, Ind.
C. W. Wier, F. J. Wobber, O. R. Russell, and R. V. Amato.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 553-560, 1973. 4 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Mining, *Structural geology, Strip mines, Indiana, Environmental effects, Land conservation, Hazards, Data collections.
Identifiers: ERTS.

ERTS-1 imagery and high-altitude infrared photography yield useful fracture data in Indiana and Illinois despite a glacial till cover. ERTS MSS bands 5 and 7 are most useful for fracture mapping in coal-bearing rocks in this region. A reasonable correlation can be made between fractures and mine roof-fall accidents. Information related to surface-mined land, such as disturbed area, water bodies, and kind of reclamation, may also be derived from the analysis of ERTS imagery. (See also W74-02561) (Knapp-USGS)
W74-02571

ERTS-1 INVESTIGATION OF ECOLOGICAL EFFECTS OF STRIP MINING IN EASTERN OHIO,
Bendix Corp., Ann Arbor, Mich.
P. E. Chase, and W. Pettyjohn.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 561-568, 1973. 4 fig, 2 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Strip mining, *Mapping, *Environmental effects, Ecology, Surveys, Ohio, Data collections, Data processing.
Identifiers: ERTS.

ERTS data were used to detect, map, and monitor the effects of strip mining. Enlarged ERTS imagery and statistically processed data (outline maps and imagery) of stripped earth and standing water were compared to aerial photos of a strip mine near Coshocton, Ohio. The outline maps and decision imagery may be used to form a disruption map of recently mined and underclaimed earth. (See also W74-02561) (Knapp-USGS)
W74-02572

THE USE OF ERTS-1 MSS DATA FOR MAPPING STRIP MINES AND ACID MINE DRAINAGE IN PENNSYLVANIA,
Pennsylvania State Univ., University Park. Office for Remote Sensing of Earth Resources.
S. S. Alexander, D. Dein, and D. P. Gold.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 569-575, 1973. 2 tab, 10 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Strip mining, *Mapping, *Acid mine water, Pennsylvania, Environmental effects, Land reclamation, Ecology, Surveys, Data collections, Data processing.
Identifiers: ERTS.

Digital processing of ERTS-1 MSS data for areas near the west branch of the Susquehanna River permits identification of stripped areas including ones that are not discernible from visual analysis of ERTS imagery. Underflight data and ground-based observations are used for ground truth. Because of associated diagnostic effects on vegetation, seasonal changes in classification criteria are being documented as repeated, cloud-free ERTS-1 coverage of the same area becomes available. Preliminary results indicate that ERTS data can be used to monitor not only the total extent of stripping in given areas but also the effectiveness of reclamation and pollution abatement procedures. (See also W74-02561) (Knapp-USGS)
W74-02573

MONITORING VEGETATION COVER ON MINE DUMPS WITH ERTS-1 IMAGERY: SOME INITIAL RESULTS,
Spectral Africa (Pty) Ltd., Randfontein (South Africa).
B. Gilbertson.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 577-584, 1973. 6 fig, 2 tab.

Descriptors: *Remote sensing, *Satellites (Artificial), *Mining, *Mine wastes, *Waste dumps, Surveys, Mapping, Vegetation effects, Land reclamation.
Identifiers: *South Africa, ERTS.

ERTS-1 imagery is being used in an attempt to differentiate between mine dumps having varying degrees of vegetative cover. The various dumps can be located and identified, and differences in vegetative cover can be seen and measured. Patterns of vegetative growth, some characteristic to particular dumps, can also be seen. Therefore, mine dumps can be differentiated with respect to their vegetative cover on the imagery received to date. Subsequent imagery showing seasonal variations should facilitate this program. (See also W74-02561) (Knapp-USGS)
W74-02574

REMOTE DETECTION OF AEROSOL POLLUTION BY ERTS,
Old Dominion Univ., Norfolk, Va. Dept. of Geophysical Sciences.
G. E. Copeland, A. R. Bandy, E. C. Kindle, R. N. Blais, and G. M. Hilton.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 585-592, 1973. 6 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Air pollution, *Path of pollutants, Surveys, Smoke, Data collections.
Identifiers: ERTS.

ERTS-1 MSS imagery of Eastern Virginia coupled with extensive ground truth air quality and meteorological data may be used for identification and surveying of particulate air-pollution sources (smoke plumes). The quantitative monitoring of smokestacks from orbital altitudes over state size regions appears possible when tied to realistic plume models and minimal ground truth. Data collected over urban areas can possibly be utilized to produce isopleths of particulates when supplemented by local measurements. (See also W74-02561) (Knapp-USGS)
W74-02575

DETECTION, MAPPING AND ESTIMATION OF RATE SPREAD OF GRASS FIRES FROM SOUTHERN AFRICAN ERTS-1 IMAGERY,
Forest Management Inst., Ottawa (Ontario).
J. M. Wightman.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 593-601, 1973. 4 fig, 1 tab.

Descriptors: *Remote sensing, *Satellites (Artificial), *Grasslands, *Burning, Surveys, Monitoring, Mapping, Africa, Data collections.
Identifiers: ERTS.

ERTS band-6 imagery of the Zambesi basin of southern Africa recorded substantial changes in burn patterns resulting from late dry season grass fires. One example from northern Botswana indicates that a fire consumed approximately 70 square miles of grassland over a 24-hour period. Another example from western Zambia indicates increased fire activity over a 19-day period. Other examples clearly define the area of widespread grass fires in Angola, Botswana, Rhodesia and Zambia. From the fire patterns visible on the sequential portions of the imagery, and the time intervals involved, the rates of spread of the fires were estimated and compared with estimates derived from experimental burning plots in Zambia and Canada. Sequential ERTS-1 imagery, of the quality studied, clearly provides the information needed to detect and map grass fires and to monitor their rates of spread in this region during the late dry season. (See also W74-02561) (Knapp-USGS)
W74-02576

MAPPING ATLANTIC COASTAL MARSHLANDS, MARYLAND, GEORGIA, USING ERTS-1 IMAGERY,
American Univ., Washington D.C. Dept. of Biology.
R. R. Anderson, V. Carter, and J. McGinness.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 603-613, 1973. 7 fig, 3 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Wetlands, *Mapping, *Surveys, Monitoring, Marshes, Data collections, Vegetation.
Identifiers: ERTS.

ERTS provides an opportunity to test the feasibility of mapping wetlands using small scale imagery. The test sites selected were in Chesapeake Bay, Maryland, and Ossabaw Island, Georgia. The upper wetland boundary drainage patterns, plant communities, including Spartina alterniflora, Spartina patens, and Juncus roemerianus, ditching activities, and lagooning were identified. ERTS is an excellent tool for many types of coastal wetland mapping. (See also W74-02561) (Knapp-USGS)
W74-02577

IDENTIFICATION OF MARSH VEGETATION AND COASTAL LAND USE IN ERTS-1 IMAGERY,
Delaware Univ., Newark. Coll. of Marine Studies.
V. Klemas, F. Daiber, and D. Bartlett.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 615-627, 1973. 8 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Wetlands, *Mapping, *Surveys, Monitoring, Marshes, Data collections, Vegetation.
Identifiers: ERTS.

Coastal vegetation species appearing in the ERTS-1 images taken on Delaware Bay on August 16 and October 10, 1972, were correlated with ground truth vegetation maps and imagery obtained from high altitude RB-57 and U-2 overflights. Five vegetation communities could be clearly dis-

criminated, including: (1) salt marsh cord grass; (2) salt marsh hay and spike grass; (3) reed grass; (4) high tide bush and sea myrtle; and (5) a group of freshwater species found in impoundments built to attract waterfowl. Spectral discrimination capabilities of ERTS-1 imagery compare favorably with those of aerial infrared photography, and spatial resolution is the dominant factor limiting the potential for detailed vegetation mapping using ERTS-1 imagery. (See also W74-02561) (Knapp-USGS)
W74-02578

APPLICATION OF ERTS-1 DATA TO THE PROTECTION AND MANAGEMENT OF NEW JERSEY'S COASTAL ENVIRONMENT,
Earth Satellite Corp., Washington, D.C. Geosciences and Environmental Applications Div.
R. L. Mairs, F. J. Wobber, D. Garofalo, and R. Yunghans.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 629-634, 1973.

Descriptors: *Remote sensing, *Satellites (Artificial), *Monitoring, *Water pollution, New Jersey, Wetlands, Beaches, Path of pollutants, Water pollution sources, Mapping, Data collections.
Identifiers: ERTS.

ERTS-1 imagery is being used by the New Jersey Department of Environmental Protection to develop information that will assist the state in managing its coastal resources. Initial analyses of imagery from several successive ERTS-1 orbits show the extent, predominant drift, and dispersion characteristics of waste disposal in coastal New Jersey waters. Imagery (MSS bands 4 and 5) for several orbits shows the New York Harbor tidal discharge extending as far south as Long Branch, New Jersey. Increased reflectance of turbid waters shows the effects of a large sewage effluent flow. As these waters are flushed with each tidal change, the turbid waters emanate out to the populous bathing beaches. (See also W74-02561) (Knapp-USGS)
W74-02579

MONITORING OCEAN DUMPING WITH ERTS--1 DATA,
Environmental Research Inst. of Michigan, Ann Arbor.
C. T. Wezernak, and N. Roller.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 635-641, 1973. 2 fig, 5 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Monitoring, *Path of pollutants, Waste disposal, Water pollution sources, Data collections.
Identifiers: *Ocean dumping (Wastes), ERTS.

Large volumes of municipal and industrial wastes are disposed of by means of dumping at sea. Disposal of wastes by barge dumping frequently produces surface films and waste fields whose fate and effects are not adequately defined. Frequently very large areas of the marine environment are affected. ERTS-1 data for the New York Bight were collected on August 16, 1972. Acid-iron wastes, sewage sludge, suspended solids, and major water mass boundary features could be seen in the study area. The surface movement of the wastes and the location of major water mass boundaries may be monitored. Synoptic coverage of the type available from satellite altitudes can be expected to contribute towards an understanding of surface circulation patterns in the area. (See also W74-02561) (Knapp-USGS)
W74-02580

ENVIRONMENTAL STUDY OF ERTS-1 IMAGERY: LAKE CHAMPLAIN AND VERMONT,
Vermont Univ., Burlington.
A. O. Lind, E. B. Henson, and J. Pelton.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 643-650, 1973. 8 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Water pollution, *Land use, Surveys, Investigations, Monitoring, Vermont, Data collections, Lakes, Path of pollutants, Water pollution sources.
Identifiers: *Lake Champlain, ERTS.

Industrial water pollution and turbidity in Lake Champlain were identified and mapped using ERTS data. ERTS imagery also provides a foundation for revising land use inventories which will be necessary for meeting some of the informational needs of the Land Use and Land Capability Act (Act 250). Major classes of land use were identified and mapped, and substantial progress was made toward the mapping of such land use divisions as crop and forest type and wetlands. (See also W74-02561) (Knapp-USGS)
W74-02581

WATER TURBIDITY DETECTION USING ERTS-1 IMAGERY,
Geological Survey, Lawrence, Kans.
H. L. Yarger, J. R. McCauley, G. W. James, L. M. Magnuson, and G. R. Marzolf.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 651-658, 1973. 5 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Turbidity, *Reservoirs, Kansas, Monitoring, Water quality, Data collections, Surveys, Great Plains, Water management (Applied), Suspended load.
Identifiers: ERTS.

ERTS-1 images of two federal reservoirs in Kansas exhibit good correlation with suspended load. The major reservoirs in Kansas, as well as in other Great Plains states, are playing increasingly important roles in flood control, recreation, agriculture, and urban water supply. Satellite imagery may prove useful for acquiring timely low cost water quality data required for optimum management of these freshwater resources. (See also W74-02561) (Knapp-USGS)
W74-02582

DIGITAL ANALYSIS OF POTOMAC RIVER BASIN ERTS IMAGERY: SEDIMENTATION LEVELS AT THE POTOMAC-ANACOSTIA CONFLUENCE AND STRIP MINING IN ALLEGHENY COUNTY, MARYLAND,
American Univ., Washington, D.C. Dept. of Biology.
J. S. Schubert, and N. H. MacLeod.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 659-664, 1973. 1 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Data processing, *Potomac River, *Strip mines, Water pollution, Sedimentation, Monitoring, Data collections, Maryland.
Identifiers: ERTS.

Two simple algorithms for classification of sedimentation levels in water and for delineation of active strip mines are used with ERTS data for sedimentation analysis of the Anacostia River, the Potomac River, and mud flats resulting from effluent of a major sewage treatment plant. Mud flats or organic or mineral origin are easily distinguished. Several classes of sedimentation are easily constructed. In imagery of Allegheny County, Maryland, strip mines occur in rural areas where open fields are on the dissected Allegheny plateau, forests are more generally in stream channels below. The mines are cut into the horizontal contour of the valley slopes and are easily distinguished from their surroundings. (See also W74-02561) (Knapp-USGS)
W74-02583

A STUDY ON THE EROSION OF NIIGATA BEACH FROM ERTS-A IMAGERY,
Tokyo Univ. (Japan). Inst. of Industrial Science.
T. Maruyasu.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Report NASA SP-327, p 665-672, 1973. 6 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Beach erosion, Monitoring, Data collections, Surveys, Mapping, Littoral drift.
Identifiers: Niigata Beach (Japan), ERTS.

One of the causes of coastal erosion can be construction works such as flood control dams, short cut channels, or breakwaters, which reduce the transportation of river silt sand. ERTS-A imagery shows the relations between the status of erosion, effluent patterns affected by the coastal current, and cultural construction works. The Niigata alluvial plain, on the Japan Sea, is produced by the Shinano River and the Agano River. The shoreline at the west beach has eroded 360 meters in 60 years since the completion of the breakwater, while the shoreline at the east beach has eroded 300 meters in 40 years since the construction of the Ohkozu short cut channel. (See also W74-02561) (Knapp-USGS)
W74-02584

APPLICATION OF ERTS DATA TO THE DETECTION OF THIN CIRRUS AND CLEAR AIR TURBULENCE,
Japan Meteorological Agency, Tokyo.
K. Tsuchiya, and T. Kamiko.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 673-680, 1973. 7 fig, 2 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Clouds, *Turbulence, *Air circulation, Winds, Weather, Meteorology, Atmospheric physics, Data collections.
Identifiers: *Clear air turbulence, ERTS.

Thin cirrus and clear air turbulence were studied using ERTS MSS data. Thin cirrus not shown in a conventional meteorological satellite picture can be revealed in ERTS MSS pictures. The cores of jet streams can be located with high accuracy from ERTS Pictures, and the possible area of clear air turbulence can be predicted. (See also W74-02561) (Knapp-USGS)
W74-02585

POLLUTED AND TURBID WATER MASSES IN OSAKA BAY AND ITS VICINITY REVEALED WITH ERTS-A IMAGERY,
Kyoto Gakuen Univ. (Japan).
K. Watanabe.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 681-687, 1973. 4 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Monitoring, *Water pollution, *Surveys, Path of pollutants, Bays, Data collections, Currents (Water).
Identifiers: *Osaka Bay (Japan), ERTS.

Water pollution is one of the most serious problems in Osaka Bay, Japan, and its vicinity. However, the state of water pollution there has never been monitored because conventional point-to-point observations do not detect periodical movement of water masses with a fairly strong tidal current. ERTS-A provides very valuable MSS imagery of Osaka Bay and its vicinity. In the MSS-4 and MSS-5 imageries a complex pattern of water masses can be seen. Some patterns are easily identified from their shapes as cloud covers or polluted water masses. A simple method distinguishes water masses from cloud cover and from noise caused by sunlight reflected from wave surfaces. The polluted water does not diffuse continuously into the oceanic water but forms masses. A front between an oceanic water mass and a polluted water mass runs NW-SE in the center of Osaka Bay. (See also W74-02561) (Knapp-USGS)
W74-02586

RED TIDE IN ISE BAY,
Toba Merchant Marine Coll. (Japan).
H. Ochiai.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 689-693, 1973. 5 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Red tide, *Surveys, Monitoring, Data collections, Water pollution, Turbidity.
Identifiers: *Ise Bay (Japan), ERTS.

From October 5 to October 26, 1972, the northwestern part of Ise Bay was seriously affected by red tide. The boundary of red tide was mapped using several imageries produced from ERTS-1 data. The green band with 0.50-0.60 wavelength detects clear water. The transparency distribution of Ise Bay shows that the area along the western coast near Yokkaichi was in poor condition, while the green band imagery shows two patterns extended to the northeast and southeast like belts; these are the areas of red tide. (See also W74-02561) (Knapp-USGS)
W74-02587

HYDROGEOLOGY OF CLOSED BASINS AND DESERTS OF SOUTH AMERICA, ERTS-1 INTERPRETATIONS,
Geological Survey, Washington, D.C.
G. E. Stoertz, and W. D. Carter.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 695-705, 1973. 4 fig, 2 tab, 2 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Water resources, Deserts, Snowpacks, Playas, Watersheds (Divides), Watersheds (Basins), Hydrogeology, Topography, Floods, Structural geology, Geologic mapping, Runoff forecasting, Geomorphology, South America, Data collections.
Identifiers: ERTS, Chile, Bolivia, Argentina, Peru.

Images from Earth Resources Technology Satellite (ERTS-1) contain data useful in studies of hydrogeology, geomorphology, and paleoclimatology. Deserts and semidesert areas in southwestern Bolivia, northwestern Argentina, northern Chile, and southeastern Peru were studied using data taken from July 30 to November 17, 1972. Hydrologic applications of ERTS imagery include (1) mapping of salars or salt-encrusted playas, which represent water discharges from closed drainage basins; (2) mapping of drainage divides, particularly around closed basins in dry regions; (3) mapping of geologic structural data; (4) revision of geologic maps to show hydrologically important differences in surficial deposits; (5) revision of hydrologic features on topographic maps; (6) monitoring seasonal changes in floodwaters to evaluate areal and seasonal changes in weather, climate, and water resources; (7) mapping of mountain snowpacks; and (8) relation of permanent drainage basin characteristics to seasonal snow cover and floodwater as an aid in estimating water resources of basins lacking meteorological or stream-gaging stations. (See also W74-02561) (Knapp-USGS)
W74-02588

DETECTION OF MAJOR RIVER BED CHANGES IN THE RIVER EBRO (NORTH-EASTERN SPAIN),
R. Espejo, J. Torrent, and C. Roquero.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 707-711, 1973. 3 fig, 1 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Meanders, *Alluvial channels, *Monitoring, Stream erosion, Sedimentation, Flood plains, Data collections.
Identifiers: ERTS, Ebro River (Spain).

The River Ebro is the most important water course in Spain. Major river bed changes were studied over a distance of 30 km either side of the city of Zaragoza using ERTS data. Image quality was good enough to permit a clear identification of the river course, and bands MSS 5 and 7 proved to be the most useful for this purpose. Repetitive coverage by means of satellites can help monitor river changes. ERTS-1 imagery also serves as a source for the detection and selection of areas of newly deposited alluvial materials. (See also W74-02561) (Knapp-USGS)
W74-02589

APPLICATIONS OF MULTISPECTRAL IMAGERY TO WATER RESOURCES DEVELOPMENT PLANNING IN THE LOWER MEKONG BASIN (KHEMER REPUBLIC, LAOS, THAILAND AND VIET-NAM),
Economic Commission for Asia and the Far East (UN), Bangkok (Thailand). Mekong Committee Secretariat.
W. J. van Liere.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A: National Aeronautics and Space Admin Rept NASA SP-327, p 713-741, 1973. 6 fig, 10 photos.

Descriptors: *Remote sensing, *Satellites (Artificial), *Water resources development, Planning, Deltas, Sedimentation, Floods, Drainage, Data collections, Soil surveys, Surveys, Monitoring.
Identifiers: ERTS, *Mekong Delta.

ERTS imagery is used for water resources planning in the lower Mekong basin. It complements data from areas which have been inaccessible in the past. It refines ground surveys, mainly of land forms and soils of existing and planned irrigation projects. It provides new information, which would be almost or entirely impossible to detect with ground surveys or conventional photography; this includes the mechanism of flooding and drainage of the delta, siltation of the Great Lake, acidity and salinity in the lower delta, and fisheries in the estuarine areas. The satellite data are particularly valuable also because their repetitive coverage gives an insight in the gradual transformation of changing features such as the extent of flooding and moisture retention in various soil types. (See also W74-02561) (Knapp-USGS)
W74-02590

APPLICATION OF ERTS-1 IMAGERY TO FLOOD INUNDATION MAPPING,
Iowa State Geological Survey, Iowa City. Remote Sensing Lab.
G. R. Hallberg, B. E. Hoyer, and A. Rango.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 745-753, 1973. 3 fig, 3 tab, 3 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Floods, *Mapping, Monitoring, Data collections, Iowa, Flood data, Flood plains.
Identifiers: ERTS, *Flood mapping, Nishnabotna River (Iowa).

In September, 1972, heavy rains initiated major flooding in southwestern Iowa, concentrated in the East and West Nishnabotna basins. Ground data and a variety of low-altitude multispectral imagery were acquired for the East Nishnabotna River on September 14-15. This successful effort showed that a near-visible infrared sensor could map inundated areas in late summer for at least three days after flood recession. ERTS-1 imagery of the area was obtained on September 18-19. Analysis of MSS imagery reinforced the conclusions of the low-altitude study while increasing the time period critical for imagery acquisition to at least seven days following flood recession. The capability of satellite imagery to map late summer flooding at a scale of 1:250,000 is exhibited by the agreement of interpreted flood boundaries obtained from ERTS-1 imagery to boundaries mapped by low-altitude imagery and ground methods. The synoptic coverage of ERTS-1 allowed extension of the flood mapping to the West Nishnabotna River. Satellite imagery allows rapid appraisal of the areal extent of flood inumdation for entire river systems. (Knapp-USGS)
W74-02591

ASSESSMENT OF FLOOD DAMAGE IN ARIZONA BY MEANS OF ERTS-1 IMAGERY,
Geological Survey, Denver, Colo.
R. B. Morrison, and M. E. Cooley.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 755-760, 1973, 6 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Floods, Arizona, Surveys, Mapping, Damages, Sedimentation, Monitoring, Flash floods, Data collections.
Identifiers: ERTS, *Flood mapping.

ERTS-1 MSS images clearly show two important effects of a large flood in southeastern Arizona--the extent of inundation and the areas affected by severe sediment deposition and erosion--although the images were made a week and a half after the flood. On October 20 and 21, 1972, the upper Gila River had its third largest flood on record. The first ERTS-1 images after the flood were made on November 1 and 2. The inundated area is best displayed on the infrared bands, particularly on band 7, where it appears as a belt along the river that is distinctly darker than adjoining parts of the flood plain. This dark belt does not appear on ERTS images that predate the flood. Presumably the low infrared reflectance of this belt is caused by still-moist soil and by flood-stressed vegetation. Inundation limits mapped from ERTS imagery agree well with those obtained by aerial photography during the flood and by ground surveys. Areas of severe sand and gravel deposition show best on band 5. By comparing before and after flood images in this band, a quick assessment can be made of the severely flood-ravaged land. ((See also W74-02561) Knapp-USGS)
W74-02592

USE OF THE SRI ELECTRONIC SATELLITE IMAGE ANALYSIS CONSOLE FOR MAPPING SOUTHERN ARIZONA PLANT COMMUNITIES FROM ERTS-1 IMAGERY,
Geological Survey, Tucson, Ariz.
R. M. Turner.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 761-768, 1973. 5 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Vegetation, *Mapping, Arizona, Ecology, Data collections, Biological communities, Plant populations.
Identifiers: ERTS, *Plant community mapping.

Cloud-free imagery covering the Tucson, Ariz., region for the period from August 22 to November 2, 1972, was used to determine the utility of ERTS-1 data for discriminating boundaries between plant communities. Color composites from MSS-5 and MSS-6 bands were recorded photographically. The color photographs were then used to compare with short-term changes in vegetative cover observed on the ground. Microdensitometric traces were made along selected traverses to quantify changes in scene irradiance across the image field. MSS-6 minus MSS-5 densitometry values were employed as a relative measure of plant cover in the wide range of vegetative zones covered by the traverses. (SEE also W74-02561) (Knapp-USGS)
W74-02593

MONITORING OF STREAMFLOW IN THE VERDE RIVER BY ERTS-1 DATA COLLECTION SYSTEM (DCS),
Geological Survey, Phoenix, Ariz. Water Resources Div.
H. H. Schumann.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 769-776, 1973. 3 fig.

Descriptors: *Remote sensing, *Telemetry, *Satellites (Artificial), *Stream gages, Gaging stations, Arizona, Streamflow, Water levels, Data collections, Data processing.
Identifiers: ERTS, *Verde River (Ariz).

The U.S. Geological Survey in cooperation with the Salt River Valley Water Users Association installed a specially designed gaging station on the Verde River near the town of Camp Verde to evaluate near-real time streamflow data furnished by ERTS-1. The installation is equipped with a Stevens digital water-level recorder, modified for telemetry, and an ERTS-1 data collection platform operating in the digital-parallel mode. During the 43-day period between November 3 and December 15, 1972, the DCS relayed 552 transmissions during 193 data passes. The DCS system transmitted stream-stage information 4.5 times per day on the average. The amount of data received far exceeded the expected single high quality transmission rate of once per 12-hour period from the DCS system. Data are sufficient to accurately compute daily mean gage heights. These, in turn, are used to compute the average daily streamflow rates during stable or slowly changing flow conditions. The digital-parallel DCS data have also furnished useful information during peak-flow periods. (See also W74-02561) (Knapp-USGS)
W74-02594

PRELIMINARY ANALYSIS OF ERTS--RELAYED WATER-RESOURCES DATA IN THE DELAWARE RIVER BASIN,
Geological Survey, Harrisburg, Pa.
R. W. Paulson.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 777-792, 1973. 7 fig.

Descriptors: *Remote sensing, *Telemetry, *Satellites (Artificial), *Stream gages, *Observation wells, Water quality, Pennsylvania, Data collections, Hydrologic data, Data processing, Delaware River.
Identifiers: ERTS.

In the Delaware River basin, the ERTS data collection system is performing well. Data collection platforms have been successfully interfaced with five stream-gaging stations and three groundwater observation wells and are being interfaced with 12 water-quality monitors in the basin. Data are being relayed during four or five ERTS orbital passes per day, which is within the design specifications of the ERTS-DCS. (See also W74-02561) (Knapp-USGS)
W74-02595

AN EVALUATION OF SPACE ACQUIRED DATA AS A TOOL FOR MANAGEMENT OF WILDLIFE HABITAT IN ALASKA,
Bureau of Sport Fisheries and Wildlife, Washington, D.C.
B. J. Van Tries.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 795-799, 1973.

Descriptors: *Remote sensing, *Satellites (Artificial), *Ducks (Wild), *Aquatic habitats, Marshes, Ponds, Lakes, Wetlands, Alaska, Wildlife habitats, Data collections, Data processing, Surveys, Monitoring.
Identifiers: ERTS.

ERTS-1 data collection techniques were tested for predictions of waterfowl populations in the fall migration in Alaska. Baseline data which are essential to the State in many aspects of their land use planning functions are also provided. The quantity, quality, and distribution of waterfowl breeding habitat are assessed through frequent ERTS measurements of hydrologic, phenological and vegetational parameters. Basic mapping of vegetation and terrain are possible in certain remote areas of the State for which little or no biological data now exist. The Bureau of Sport Fisheries and Wildlife ERTS-1 experiment on waterfowl habitat is based on the accepted theory that a reliable correlation exists between the 'degree of wetness' (number of ponds and wetlands) existing in July and annual production of birds. (See also W74-02561) (Knapp-USGS)
W74-02596

PRELIMINARY EVALUATION OF ERTS-1 FOR DETERMINING NUMBERS AND DISTRIBUTION OF PRAIRIE PONDS AND LAKES,
Environmental Research Inst. of Michigan, Ann Arbor.
E. A. Work, Jr., D. S. Gilmer, and A. T. Klett.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 801-808, 1973. 5 fig, 6 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Ponds, *Grasslands, Lakes, North Dakota, Mapping, Surveys, Data collections, Data processing, Ducks (Wild), Wildlife habitats, Wetlands.
Identifiers: ERTS.

ERTS-1 and aircraft multispactral data collected over a North Dakota test site during July, 1972, were compared to evaluate the capability of the satellite sensors to detect numbers and sitribution of prairie ponds and lakes. Surface water areas larger than two acreas may be recognized. The proportion estimation technique improves the accuracy of area determination and small pond detection. (See also W74-02561) (Knapp-USGS)
W74-02597

DYNAMICS OF PLAYA LAKES IN THE TEXAS HIGH PLAINS,
Texas Tech Univ., Lubbock. Dept. of Geosciences.
C. C. Reeves, Jr.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 809-817, 1973. 6 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Playas, *Lakes, Great Plains, Surveys, Mapping, Wetlands, Water balance, Data collections, Ecology.
Identifiers: ERTS, *High Plains (Tex).

Satellite imagery can be used for a census of the lake basins which commonly exist in semiarid areas and which sporadically contain water at various times of the year. Storm paths and runoff collected by such lake basins can also be closely monitored, the accuracy dependent on periodicity of the orbits and the size of the basins. Study of the relationships between spectral differences (obtained from ERTS-1 imagery) and the water balance ecosystem of these lake basins in the High Plains of Texas is in a preliminary stage. ERTS-1 MSS band 4 has the poorest tonal contrast in semiarid West Texas, band 5 is best of definition of vegetation, band 6 is best for defining large water areas, and band 7 is best for counting small lake basins with water. Ground truth studies reveal significant differences between the test sites, the relative importance of which is reflected by the hydrologic balance of each lake basin. (See also W74-02561) (Knapp-USGS)
W74-02598

STUDIES IN THE LAKE ONTARIO BASIN USING ERTS-1 AND HIGH ALTITUDE DATA,
Guelph Univ. (Ontario).
A. Falconer, S. H. Collins, W. T. Dickison, R. Protz, and R. P. Bukata.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 819-828, 1973. 4 fig, 15 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Lake Ontario, Surveys, Mapping, Land use, Geomorphology, Sedimentation, Water circulation, Soil moisture, Monitoring, Data processing, Data collections, Hydrologic data, Great Lakes region, Water balance, Planning, Water management (Applied).
Identifiers: ERTS, *Lake Ontario basin.

ERTS studies in the Lake Ontario basin are designed to provide input for models of river basin discharge and macroscale features of lake circulation. High altitude imagery is needed to record the dynamic features of Lake Ontario so that ERTS-1 data may be interpreted. Soil moisture, land use, soils, sediments, and geomorphology data are available on a regional scale from ERTS-1 products. (See also W74-02561) (Knapp-USGS)
W74-02599

PROGRESS OF AN ERTS-1 PROGRAM FOR LAKE ONTARIO AND ITS BASIN,
Environmental Research Inst. of Michigan, Ann Arbor.
T. W. Wagner, and F. C. Polcyn.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National

Aeronautics and Space Admin Rept NASA SP-327, p 829-836, 1973. 5 fig, 5 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Lake Ontario, Surveys, Mapping, Land use, Geomorphology, Sedimentation, Water circulation, Soil moisture, Monitoring, Data processing, Data collections, Hydrologic data, Great Lakes region, Water balance, Planning, Water management (Applied).
Identifiers: ERTS, *Lake Ontario basin.

The Lake Ontario drainage basin covers over 32,000 square miles of U.S. and Canadian territory. ERTS-1 data are contributing to the comprehensive study of this basin as part of the International Field Year for the Great Lakes (IFYGL). The processing approach used for obtaining detailed and objective synoptic information applicable to terrestrial water balance studies of such a large area is discussed. A simple ratio algorithm was tested for minimizing daily variations in ERTS data and for allowing the discrimination of surface features and land use classes of hydrologic significance. These steps are necessary if ERTS data are to provide the quantitative information required for the study and management of areas of regional size. (See also W74-02561) (Knapp-USGS)
W74-02600

REMOTE SENSING OF TURBIDITY PLUMES IN LAKE ONTARIO,
Geological Survey, Arlington, Va.
E. J. Pluhowski.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 837-846, 1973. 8 fig, 4 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Lake Ontario, *Turbidity, Surveys, Path of pollutants, Water circulation, Mapping, Monitoring, Data collections, Currents (Water).
Identifiers: ERTS, Genesee River, Welland Canal, Oswego River.

Preliminary analyses of ERTS-1 imagery demonstrates the utility of the satellite to monitor turbidity plumes generated by the Welland Canal, and the Genesee and Oswego Rivers. Although visible in high altitude photographs, the Niagara River plume is not readily identifiable from satellite imagery. (See also W74-02561) (Knapp-USGS)
W74-02601

ERTS-1 VIEWS THE GREAT LAKES,
Wisconsin Univ., Milwaukee. Air Pollution Analysis Lab.
W. A. Lyons, and S. R. Pease.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol I--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 847-854, 1973. 5 fig.

Descriptors: *Remote sensing, *Satellites (Artificial), *Great Lakes region, *Air pollution effects, *Meteorology, Data collections, Air pollution, Clouds, Precipitation (Atmospheric), Snow, Weather.
Identifiers: ERTS.

The meteorological content of ERTS images, particularly mesoscale effects of the Great Lakes and air pollution dispersion, is summarized. Summertime lake breeze frontal clouds and various winter lake-effect convection patterns and snow squalls are revealed in great detail. A clear-cut spiral vortex over southern Lake Michigan is related to an early snowstrom in the Chicago area. Marked cloud changes induced by orographic and frictional effects on Lake Michigan's lee shore snow squalls may be seen. The most important finding, however, is a clear-cut example of alterations in cumulus convection by anthropogenic condensation nuclei from steel mills during a snow squall situation. Jet aircraft condensation trails are also found frequently. (See also W74-02561) (Knapp-USGS)
W74-02602

USE OF ERTS DATA FOR MAPPING SNOW COVER IN THE WESTERN UNITED STATES,
Environmental Research and Technology, Inc., Lexington, Mass.
J. C. Barnes, and C. J. Bowley.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NASA SP-327, p 855-862, 1973. 7 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Snow cover, *Snow surveys, Mapping, Runoff forecasting, Monitoring, Terrain analysis, Mountains.
Identifiers: ERTS.

ERTS data are evaluated for mapping snow cover, primarily in the mountainous areas of the western United States. The specific objectives are to determine the spectral interval most suitable for snow detection, to determine the accuracy with which snow lines can be mapped in comparison with the accuracies attainable from other types of measurements, and to develop techniques to differentiate reliably between snow and clouds, and to understand the effects of terrain and forest cover on snow detection. The MSS-5 spectral band is the most useful for detecting and mapping mountain snow cover. Snow cover can be readily detected and can be distinguished from clouds. In addition to various natural features, manmade features such as roads, electric powerlines, cultivated fields, and timber cuts are visible. Several glaciers along the coasts of Greenland exhibit a uniform reflectance in the MSS-4 band, whereas in the MSS-7 band the lower elevation parts appear much darker than the higher elevations. This difference in reflectance is believed to be due to the existence of melt water on the surface of the lower parts of the glaciers as opposed to snow cover on the upper parts. (See also W74-02561) (Knapp-USGS)
W74-02603

EVALUATION OF ERTS IMAGERY FOR MAPPING AND DETECTION OF CHANGES OF SNOWCOVER ON LAND AND ON GLACIERS,
Geological Survey, Tacoma, Wash.
M. F. Meier.
In: Symposium on Significant Results Obtained from the Earth Resources Technology Satellite-1: Vol 1--Technical Presentations, Sect A, National Aeronautics and Space Admin Rept NSAS SP-327, p 863-875, 1973. 6 fig, 9 ref.

Descriptors: *Remote sensing, *Satellites (Artificial), *Snow cover, *Snowpacks, *Glaciers, Surveys, Snow surveys, Runoff forecasting, Data collections, Mapping, Glaciation, Mountains.
Identifiers: ERTS.

The snow cover area on drainage basins was measured from ERTS imagery by video density slicing with a repeatability of 4%. Data from ERTS images of the melt season snow cover in the Thunder Creek drainage basin in the North Cascades were combined with existing hydrologic and meteorologic observations to enable calculation of the time distribution of the water stored in this mountain snowpack. Similar data could be used for frequent updating of expected inflow to reservoirs. Equivalent snowline altitudes were determined from area measurements. Snowline altitudes were also determined by combining enlarged ERTS images with maps with an accuracy of about 60 m under favorable conditions. Ability to map snow cover or to determine snowline altitude depends primarily on cloud cover and vegetation and secondarily on slope, terrain roughness, sun angle, radiometric fidelity, and amount of spectral information available. ERTS imagery was also used to measure glacier accumulation area, detect subtle flow structures on glaciers, identify surgin glaciers, and monitor changes in tidal glacier termini. (See also W74-02561) (Knapp-USGS)
W74-02604

USE OF ERTS-1 IN COASTAL STUDIES,
Army Coastal Engineering Research Center, Washington, D.C.
For primary bibliographic entry see Field 02L.
W74-02633

DESIGN CONSIDERATIONS FOR A 3-D LASER DOPPLER VELOCIMETER FOR STUDYING GRAVITY WAVES IN SHALLOW WATER,
Army Coastal Engineering Research Center, Washington, D.C.
For primary bibliographic entry see Field 02L.
W74-02642

AN ANNOTATED BIBLIOGRAPHY OF AERIAL REMOTE SENSING IN COASTAL ENGINEERING,
Clemson Univ., S.C. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02L.
W74-02646

7C. Evaluation, Processing and Publication

SYSTEM 21, 'JUPITER' (A DESIGN SYSTEM FOR TWO-DIMENSIONAL NEARLY-HORIZONTAL FLOWS),
Danish Hydraulic Inst., Copenhagen. Computational Hydraulics Center.
M. B. Abbott, A. Damsgaard, and G. S. Rodenhuis.
Journal of Hydraulic Research, Vol. 11, No 1, p 1-28, 1973. 7 fig, 26 ref.

Descriptors: *Computer programs, *Currents (Water), *Mathematical models, *Numerical analysis, Ocean currents, Winds, Ocean circulation, Beaches, Shores, Waves (Water).

An ensemble of mutually compatible routines for 2-dimensional flows organized into a single software entity can be installed on any large digital computer and used in a routine, repetitive way without any knowledge of its internal operation. Through such a system, advanced techniques of numerical analysis, programming and hardware can be made available to scientific and engineer users in a simple, cheap and reliable way. The system is capable of constructing a model of any region of two-dimensional nearly-horizontal flow, when presented only with the topography of the region, and of operating this model from given initial and boundary conditions, wind velocities, tidal-tractive forces, latitude, and other external conditions if required. It can provide a variety of output organizations: velocity plots and isoline plots for selected regions or the complete computational fields, as well as time variations of principal variables at selected points. (Knapp-USGS)
W74-02159

INPUT SPECIFICATIONS TO STOCHASTIC DECISION MODELS,
Arizona Univ., Tucson. Dept. of Systems Engineering.
For primary bibliographic entry see Field 02E.
W74-02209

OPTIMIZATION OF INDUSTRIAL SYSTEMS WITH THE SEPARABLE PROGRAMMING AND THE GENERALIZED REDUCED GRADIENT METHODS,
Kansas State Univ., Manhattan. Dept. of Industrial Engineering.
For primary bibliographic entry see Field 05G.
W74-02213

DEVELOPMENT OF AN 'OPERATIONS' MODEL FOR MONTANA'S WATER RESOURCES: MIDDLE CREEK RESERVOIR OPERATION,
Montana State Univ., Bozeman. Water Resources Research Center.
For primary bibliographic entry see Field 04A.
W74-02214

FLOODPLAIN MAPPING AND PLANNING FOR THE 50 AND 100 YEAR INTERVAL FLOOD ZONES OF THE BITTERROOT VALLEY, MONTANA,
Montana Univ., Missoula.
For primary bibliographic entry see Field 04A.
W74-02215

PSYCHROMETRIC DATA PATTERNS AND PREDICTION MODELS,
Wyoming Univ., Laramie. Water Resources Research Inst.
For primary bibliographic entry see Field 02B.
W74-02220

CILIATED PROTOZOA. AN ILLUSTRATED GUIDE TO THE SPECIES USED AS BIOLOGICAL INDICATORS IN FRESHWATER BIOLOGY,
For primary bibliographic entry see Field 02I.
W74-02236

MAPPING AVERAGE ANNUAL SURFACE WATER RESOURCES OF THE HYDROLOGICAL REGIONS OF NELSON, NEW ZEALAND,
Ministry of Works, Nelson (New Zealand). Water and Soil Div.
For primary bibliographic entry see Field 02E.
W74-02290

COMPUTER SIMULATION OF STORM WATER RUNOFF,
Northwestern Univ., Evanston, Ill. Technological Inst.
For primary bibliographic entry see Field 02E.
W74-02310

DAM-BREAK FLOOD IN A PRISMATIC DRY CHANNEL,
California Univ., Davis. Dept. of Engineering.
For primary bibliographic entry see Field 08B.
W74-02311

SATURATED-UNSATURATED SEEPAGE BY FINITE ELEMENTS,
Volcani Inst. of Agricultural Research, Bet-Dagan (Israel). Dept. of Soil and Water.
For primary bibliographic entry see Field 02G.
W74-02313

A GUIDE TO IMPORTANT CHARACTERISTICS AND VALUES OF FRESHWATER WETLANDS IN THE NORTHEAST.
Massachusetts Univ., Amherst. Dept. of Forestry and Wildlife Management.
For primary bibliographic entry see Field 04B.
W74-02324

GENERAL SOILS STUDY: PEARL RIVER, HANCOCK, HARRISON COUNTIES, MISSISSIPPI.
Soil Conservation Service, Gulfport, Miss.
For primary bibliographic entry see Field 02G.
W74-02333

APPLICATION AND CONSEQUENCES OF PRECIPITATION OBSERVATIONS IN THE REPUBLIC OF SUDAN IN VIEW OF THE NOMADIC LIFE AND ECONOMY,
Southern Oregon Coll., Ashland. Dept. of Geography.
For primary bibliographic entry see Field 02B.
W74-02348

EVALUATION OF SOIL MOISTURE REGIME IN A WATERSHED,
New Brunswick Univ., Fredericton.
For primary bibliographic entry see Field 02G.
W74-02355

USE OF DIGITAL COMPUTER TECHNIQUES IN WATER RESOURCES DATA STORAGE,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
For primary bibliographic entry see Field 04B.
W74-02357

INTERPRETATION OF INFRARED SPECTA USING PATTERN RECOGNITION TECHNIQUES,
Pennsylvania State Univ., University Park. Dept. of Chemistry.
For primary bibliographic entry see Field 02K.
W74-02376

HYMO: PROBLEM-ORIENTED COMPUTER LANGUAGE FOR HYDROLOGIC MODELING--USERS MANUAL,
Agricultural Research Service, Riesel, Tex.
For primary bibliographic entry see Field 02A.
W74-02469

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR URBAN STUDIES IN THE HOUSTON, TEXAS METROPOLITAN AREA, 1971,
Geological Survey, Austin, Tex.
For primary bibliographic entry see Field 02E.
W74-02471

CALIFORNIA HIGH WATER, 1970-1971,
California State Dept. of Water Resources, Sacramento. Div. of Resources Development.
For primary bibliographic entry see Field 02E.
W74-02474

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR LITTLE ELM CREEK, TRINITY RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
For primary bibliographic entry see Field 02E.
W74-02477

ANNUAL COMPILATION AND ANALYSIS OF HYDROLOGIC DATA FOR CALAVERAS AND ESCONDIDO CREEKS, SAN ANTONIO RIVER BASIN, TEXAS, 1971,
Geological Survey, Austin, Tex. Water Resources Div.
For primary bibliographic entry see Field 02E.
W74-02478

FLOOD OF JUNE 1972 AT CORNING, NEW YORK,
Geological Survey, Washington, D.C.
K. I. Darmer, and L. A. Wagner.
For sale by USGS, Washington, D.C. 20242, Price $0.75.

Descriptors: *Floods, *Flood data, *Historic floods, *New York, Hydrologic data, Flood damage, Streamflow, Runoff, Flow rates, Peak discharge, Flood profiles, Rainfall, Gaging stations, Flood frequency, Maps, Photography.
Identifiers: *Corning (N.Y.).

This one-sheet atlas describes the greatest flood disaster in the history of New York which occurred during late June 1972 as a result of torrential rains brought by the remnants of Tropical Storm Agnes. The city of Corning, in southwest-central New York, was subjected to the full fury of the flood as crests from the Tioga, Canisteo, and Cohocton Rivers moved into the Chemung River at Corning. Heavy loss of life and property was sustained in the city of Corning and in nearby communities of Gang Mills, Painted Post, Riverside, and South Corning. Maps, graphs, tables and photographs show: bihourly (every 2 hours) precipitation at Hornell, New York, June 20-23, 1972; peak stages and discharges, Chemung River basin, June 23, 1972; peak flood stages above agage height 18.0 feet, Chemung River at Corning, New York, 1865-1972; floodflows entering Chemung River at Corning, June 23, 1972; flood-frequency, Chemung River basin, New York; profiles of floods on Cohocton, Tioga and Chemung Rivers; and flooding in vicinity of Warren and East William Streets in Corning, June 1972. (Woodard-USGS)
W74-02479

HYDROLOGY AND WATER RESOURCES OF THE NEPONSET AND WEYMOUTH RIVER BASINS, MASSACHUSETTS,
Geological Survey, Washington, D.C.
R. A. Brackley, W. B. Fleck, and W. R. Meyer.
For sale by USGS, Washington, D.C., 20244, Price $1.00 per set. Hydrologic Investigations Atlas HA-484, 3 sheets, 1973. 5 map, 1 tab, 25 ref.

Descriptors: *Water resources development, *Hydrologic data, *Surface waters, *Groundwater resources, *Massachusetts, River basins, Water quality, Water supply, Streamflow, Aquifer characteristics, Water yield, Planning, Flood data, Peak discharge, Low flow, Stream gages, Water analysis, Chemical analysis, Maps, Hydrographs.
Identifiers: *Neponset River basin (Mass.), *Weymouth River basin (Mass.).

This 3-sheet atlas describes the water resources of parts of Massachusetts. The goal of the investigation is to provide information for use in water-resources planning and to aid in the selection of sites for potential water-supply development. The investigation is subdivided into a series of river-basin studies. The regions included in this report are those parts of the Neponset, Weymouth Fore, and Weymouth Back River basins that are upstream from the tide-affected or heavily-urbanized areas of their lower basins. These streams drain the area south of Boston and flow in a northerly direction to Boston Harbor. The study area encompasses 135 square miles of gently rolling terrain having a local relief of generally 50 to 100 feet. Average precipitation is about 45 inches per year. Of this, about 22 inches is lost through evapotaranspiration, about 20 inches is discharged from the area as streamflow, about 2 inches is piped out as sewage or for use outside the area, and the remainder leaves as groundwater underflow. Surface water and groundwater are generally soft to moderately hard and mildly acid. The major quality problems in most streams and in much of the groundwater are concentrations of iron and manganese that exceed the limits recommended for public water supplies by the U.S. Public Health Service. (Woodard-USGS)
W74-02480

STATISTICAL ANALYSIS OF NORTH CAROLINA PRECIPITATION DATA,
North Carolina State Univ., Raleigh. Dept. of Geosciences.
For primary bibliographic entry see Field 02B.
W74-02632

08. ENGINEERING WORKS

8A. Structures

A SUMMARY ANALYSIS OF NINETEEN TESTS OF PROPOSED EVALUATION PROCEDURES ON SELECTED WATER AND LAND RESOURCE PROJECTS.
Water Resources Council, Washington, D.C.
For primary bibliographic entry see Field 06B.
W74-02188

FLOOD CONTROL FUNDS -- 1970 REPORT TO THE LEGISLATURE.
California State Dept. of Water Resources, Sacramento.
For primary bibliographic entry see Field 06C.
W74-02292

OGUNQUIT SAND DUNE LAND STABILIZATION MEASURE, YORK COUNTY IN MAINE, THRESHOLD TO MAINE RESOURCE CONSERVATION AND DEVELOPMENT PROJECT (FINAL ENVIRONMENTAL STATEMENT).
Soil Conservation Service, Orono, Maine
For primary bibliographic entry see Field 04A.
W74-02504

AN ANNOTATED BIBLIOGRAPHY OF AERIAL REMOTE SENSING IN COASTAL ENGINEERING,
Clemson Univ., S.C. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02L.
W74-02646

8B. Hydraulics

LONG WAVES IN SHALLOW TRIANGULAR CHANNELS,
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 02E.
W74-02158

SYSTEM 21, 'JUPITER' (A DESIGN SYSTEM FOR TWO-DIMENSIONAL NEARLY-HORIZONTAL FLOWS),
Danish Hydraulic Inst., Copenhagen. Computational Hydraulics Center.
For primary bibliographic entry see Field 07C.
W74-02159

A NEW OSCILLATING WATER TUNNEL,
Queen's Univ., Kingston (Ontario). Coastal Engineering Research Lab.
For primary bibliographic entry see Field 02J.
W74-02160

THE TURBULENT TEMPERATURE MIXING LAYER,
Queen's Univ., Kingston (Ontario). Dept. of Civil Engineering.
W. E. Watt, and W. D. Baines.
Journal of Hydraulic Research, Vol 11, No 2, p 157-166, 1973. 4 fig, 3 ref.

Descriptors: *Mixing, *Diffusion, *Dispersion, *Open channel flow, Water temperature, Heat transfer, Turbulence, Turbulent flow, Uniform flow.

Measurement of temperature distribution, thermal diffusivity and temperature fluctuations were made in a uniform turbulent flow with a step change in temperature. The spread of temperature is described by a constant diffusion coefficient which when related to the local turbulence properties compares well with measurements in the core region of open channel flow. In practice this means that the dispersion of pollutants in the almost constant velocity regions in open channel flows and over short distances in the atmosphere can be predicted from a knowledge of the mean flow. (Knapp-USGS)
W74-02162

HYDROLOGIC EVALUATIONS IN BRIDGE PIER SCOUR DESIGN,
Oregon State Univ., Corvallis. Dept. of Civil Engineering.
P. C. Klingeman.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10224, p 2175-2184, December 1973. 4 ref.

Descriptors: *Scour, *Bridges, *Piers, *Channel erosion, *Stream stabilization, Hydraulics, Erosion, Floods, Sediment transport, Channel improvement, Alluvial channels, Streamflow, Aerial photography, Stream gages.

Several hydrologic evaluations are important for the design of bridge piers to protect them against streambed scour: (1) prediction of the local stage versus discharge relation: (2) determination of appropriate design floods, their recurrence intervals, and their stages: (3) selection of suitable streambed reference elevations; (4) assessment of hydrograph influences on channel stability with respect to channel alignment, streambed configuration, and streambed degradation; (5) evaluation of the effects of dams, dredging, and sand-and-gravel operations upon sediment transport near bridge piers; (6) evaluation of the effects of scour protection measures; and (7) anticipation of the magnitude of debris transport during floods as related to river stage and to watershed conditions. Method and difficulties in making these hydrologic evaluations are examined. The techniques considered rely mainly upon the development and analysis of stream-gaging records and the analysis of aerial photographs. (Knapp-USGS)
W74-02309

DAM-BREAK FLOOD IN A PRISMATIC DRY CHANNEL,
California Univ., Davis. Dept. of Engineering.
J. G. Sakkas, and T. Strelkoff.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10233, p 2195-2216, December 1973. 11 fig, 21 ref, 3 append. USACE Contract DACW05-71-C-0103 Calif WRC W-259.

Descriptors: *Flood waves, *Dam failure, *Simulation analysis, Floods, Mathematical models, Unsteady flow, Open channel flow.

A mathematical model is presented for the prediction of the flood wave resulting from the instantaneous break of a dam in a prismatic, dry channel of general parabolic cross section. It consists of the numerical integration of the characteristic equations over the irregular grid formed by the characteristic lines using a predictor-corrector scheme. The solution is advanced towards the wave front by a gradual refinement of the characteristics net for reasons of accuracy and economy. Finally, the solution is extended over a short region to the wave tip, which is characterized by zero depth, using a simplified form of the momentum equation resulting from physical considerations in the wave-tip region. Computed results are compared with experimental and theoretical results obtained by others. Corroboration with experimental results is generally good. The solution can be advanced in time until the negative wave propagating into the still water reaches the upstream end of the reservoir. (Knapp-USGS)
W74-02311

FLOW IN OPEN CHANNELS WITH SMOOTH CURVED BOUNDARIES,
Pahlavi Univ., Shiraz (Iran). Dept. of Engineering.
M. S. Moayeri.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10194, p 2217-2232, December 1973. 9 fig, 13 ref, append.

Descriptors: *Open channel flow, *Free surfaces, *Flow around objects, Equations, Weirs, Spillway crests, Flow profiles, Computer programs, Hydraulics, *Boundary processes.

A method of computing flow in open channels with curved transitions in cross section is illustrated by application to an example, the potential flow over a smooth step in an open channel. A detailed description of the flow is given by a pair of integro-differential equations in the free-surface and solid-boundary elevations, derived from the solution of a boundary-value problem of the Dirichlet type in an infinite strip in the complex potential plane. The use of numerical approximations to both the derivatives and integrals in the integro-differential equations leads to a system of simultaneous nonlinear algebraic equations, and this is then solved by a special method of successive approximation. Solutions are obtained for approach Froude numbers F $\pm$ 0.4 and 1.7. The computed output consists of the geometry of the free surface, the flow net within, and velocity components and pressure at any point in the flow. (Knapp-USGS)
W74-02312

ADJUSTMENT OF FRICTION IN HYDRAULIC MODELS OF LAKES,
Worcester Polytechnic Inst., Mass. Alden Research Labs.
For primary bibliographic entry see Field 02H.
W74-02314

BED SCOUR AT END-DUMP CHANNEL CONSTRICTIONS,
Alberta Univ., Edmonton. Dept. of Civil Engineering.
B. P. Das.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol 99, No HY12, Paper 10228, p 2273-2291, December 1973. 9 fig, 2 tab, 20 ref, append.

Descriptors: *Scour, *Alluvial channels, *Dams, Hydraulics, Erosion, *Channel erosion, Stream erosion, Rockfill dams.
Identifiers: Flow constrictions.

One method of constricting a channel is by end-dumping loose rockfill from one or both banks. Bed scour occurs around the leading face and downstream of such end-dumped dams built into alluvial channels. Analysis of the problem indicates the Froude number of approach flow, the contraction ratio, and the ratio of the maximum scoured depth to the normal flow depth to be the essential nondimensional variables. The maximum scoured depth is influenced also by the size and density of the bed sediment. On the basis of laboratory studies, the functional relationship was established and design curves are presented to directly determine the maximum scoured depth. The location of deepest scour and rate of scour are discussed. (Knapp-USGS)
W74-02316

8C. Hydraulic Machinery

ANALYSIS OF INTERNAL FLOW CHARACTERISTICS OF A SMOOTH-DISK WATER--BRAKE DYNAMOMETER,
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
D. G. Evans.
Available from NTIS, Springfield, Va., 22151 as NASA TN D-7234 Price $3.00 printed copy; $1.45 microfiche. Technical Note D-7234, May 1973. 50 p, 17 fig, 2 tab, 6 ref, 6 append.

Descriptors: *Fluid mechanics, *Dynamometers, *Hydraulic models, *Flow characteristics, *Rotational flow, Turbulence, Viscous flow, Shear stress, Correlation analysis, Methodology, Submergence.
Identifiers: *Water brake, Rotating smooth disk, Dimensional analysis.

The principal of absorbing power with an enclosed partially submerged rotating disk through the turbulent viscous shearing of water is discussed. Reference information is used to develop a flow model of the water brake. A method is then presented that uses vector diagrams to relate the effects of rotational flow, through flow, and secondary flow to power absorption. The method is used to describe the operating characteristics of an example 111-cm (43.7 in) diameter water brake. Correlating performance parameters are developed in a dimensional analysis. (Woodard-USGS)
W74-02475

8D. Soil Mechanics

BED SCOUR AT END-DUMP CHANNEL CONSTRICTIONS,
Alberta Univ., Edmonton. Dept. of Civil Engineering.
For primary bibliographic entry see Field 08B.
W74-02316

GENERAL SOILS STUDY: PEARL RIVER, HANCOCK, HARRISON COUNTIES, MISSISSIPPI.
Soil Conservation Service, Gulfport, Miss.
For primary bibliographic entry see Field 02G.
W74-02333

8F. Concrete

EFFECT OF A CEMENT ANTICORROSION COATING ON THE QUALITY OF DRINKING WATER, (IN RUSSIAN),
Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad (USSR).
For primary bibliographic entry see Field 05B.
W74-02233

8I. Fisheries Engineering

THE QUANTITY AND DIMENSIONS OF MICROORGANISMS IN BOTTOM SEDIMENTS OF FISH-BREEDING PONDS (IN RUSSIAN),
Ukrainian Research Inst. of the Fish Industry, Kiev (USSR).
A. F. Antipchuk.
Gidrobiol Zh, Vol 8, No 2, p 63-67, 1972, Illus.
Identifiers: *Bacteria, *Bottom sediments, Breeding, *Microorganisms, Sediments, *Fish breeding ponds.

The relationship between the depth of microorganic sediments and the quantity of microorganisms was studied. As the depth increases, the quantity of microorganisms decreases, but the quantity of spores increases. The volume of rod-like bacteria changed very little with the depth, but the cocci volume increased with the depth.--Copyright 1973, Biological Abstracts, Inc.
W74-02228

THE PROSPECTS OF USING THE RYBINSK WATER STORAGE BASIN FOR FISHERIES, (IN RUSSIAN),
L. K. Il'ina, and N. A. Gordeev.
Vopr Ikhtiol. Vol 12, No 5, p 835-842. 1972. Illus.
Identifiers: *Fisheries, Pollution abatement, *USSR (Rybinsk storage lake), Water pollution.

Measures necessary for stepping up fishing in the Rybinsk storage lake, USSR, include selection of table fish species, improvement of spawning grounds and other ecological conditions, and abatement of water pollution.--Copyright 1973, Biological Abstracts, Inc.
W74-02241

THE HYDROLOGY OF TEN STREAMS IN WESTERN WASHINGTON AS RELATED TO THE PROPAGATION OF SEVERAL PACIFIC SALMON SPECIES,
Geological Survey, Tacoma, Wash.
M. R. Collings, and G. W. Hill.
Available from NTIS, Springfield, Va. 22151, PB-224 066; Price $3.00 printed copy; $1.45 microfiche. Water-Resources Investigations 11-73, 1973. 149 p, 77 fig, 21 tab, 29 ref.

Descriptors: *Fish migration, *Spawning, *Salmon, *Washington, Streamflow, Water quality, Streambeds, Data collections, Hydrology, Channel morphology, Stream fisheries, Evaluation, Environmental effects.
Identifiers: *Salmon spawning.

Basic to all other considerations related to the preservation and enhancement of the Pacific salmon runs in Washington are the quantitative and qualitative aspects of the streams utilized by the fish. First, there must be sufficient quantities of water for salmon propagation. Second, stream-hydraulic conditions of depth and velocity must be favorable for salmon spawning and rearing. Third, water quality must be favorable with regard to temperature, suspended sediment, dissolved oxygen, and the quantity of dissolved minerals. This is the third in a series of reports that discuss the results of investigations to determine preferred spawning and rearing discharges on selected streams in western Washington. Using preferred depth and velocity criterion previously determined by anadromous-fish biologists, 300 sets of measurements of depth, velocity, and discharge were obtained during 10 visits to three study reaches on each of 10 streams. The data were evaluated to determine the preferred spawning and rearing flows for fall chinook, spring chinook, sockeye and coho salmon. Documentation also was made of streambed-gravel sizes, water temperatures, suspended-sediment concentrations, dissolved-oxygen concentrations, and specific conductance. (Woodard-USGS)
W74-02297

SEASONAL VARIATIONS IN THE QUALITATIVE AND QUANTITATIVE COMPOSITION OF YOUNG FISH POPULATIONS IN THE VARVARA RESERVOIR, (IN RUSSIAN),
For primary bibliographic entry see Field 02H.
W74-02560

PUGET SOUND RESIDENT COHO SALMON STUDY,
Washington State Dept. of Fisheries, Olympia.
For primary bibliographic entry see Field 02L.
W74-02639

DEVELOPMENT OF A MATHEMATICAL MODEL TO PREDICT THE OCCURRENCE OF CYNOSCION ARENARIUS IN MISSISSIPPI ESTUARIES,
Mississippi Marine Conservation Commission, Biloxi.
For primary bibliographic entry see Field 02L.
W74-02640

10. SCIENTIFIC AND TECHNICAL INFORMATION

10C. Secondary Publication And Distribution

CHLORINATION EFFECTS ON ORGANIC CONSTITUENTS IN EFFLUENTS FROM DOMESTIC SANITARY SEWAGE TREATMENT PLANTS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 05C.
W74-02416

SELECTED REFERENCES, GROUND-WATER CONTAMINATION, THE UNITED STATES OF AMERICA AND PUERTO RICO.
Geological Survey, Washington, D.C. Water Resources Div.
For primary bibliographic entry see Field 05B.
W74-02482

AN ANNOTATED BIBLIOGRAPHY OF AERIAL REMOTE SENSING IN COASTAL ENGINEERING,
Clemson Univ., S.C. Dept. of Civil Engineering.
For primary bibliographic entry see Field 02L.
W74-02646

10F. Preparation of Reviews

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CENTERS OF COMPETENCE AND THEIR SUBJECT COVERAGE

- Ground and surface water hydrology at the Water Resources Division of the U. S. Geological Survey, U. S. Department of the Interior.
- Metropolitan water resources planning and management at the Center for Urban and Regional Studies of University of North Carolina.
- Eastern United States water law at the College of Law of the University of Florida.
- Policy models of water resources systems at the Department of Water Resources Engineering of Cornell University.
- Water resources economics at the Water Resources Center of the University of Wisconsin.
- Eutrophication at the Water Resources Center of the University of Wisconsin.
- Water resources of arid lands at the Office of Arid Lands Studies of the University of Arizona.
- Water well construction technology at the National Water Well Association.
- Water-related aspects of nuclear radiation and safety at the Oak Ridge National Laboratory.
- Water resource aspects of the pulp and paper industry at the Institute of Paper Chemistry.

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- Thermal pollution at the Department of Sanitary and Water Resources Engineering of Vanderbilt University.
- Wastewater treatment and management at the Center for Research in Water Resources of the University of Texas.
- Methods for chemical and biological identification and measurement of pollutants at the Analytical Quality Control Laboratory of the Environmental Protection Agency.
- Coastal pollution at the Oceanic Research Institute.
- Water treatment plant waste pollution control at American Water Works Association.
- Effect on water quality of irrigation return flows at the Department of Agricultural Engineering of Colorado State University.
- Agricultural livestock waste at East Central State College, Oklahoma.

Subject Fields

1 NATURE OF WATER

2 WATER CYCLE

3 WATER SUPPLY AUGMENTATION AND CONSERVATION

4 WATER QUANTITY MANAGEMENT AND CONTROL

5 WATER QUALITY MANAGEMENT AND PROTECTION

6 WATER RESOURCES PLANNING

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